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THE RELATIONSHIPS BETWEEN ILLNESS PERCEPTIONS, SOCIAL SUPPORT, COPING ON MOOD AFTER FIRST-TIME MYOCARDIAL INFARCTION

Submitted by

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ABSTRACT

The aim of this study was to examine how illness perceptions, social support, and coping influence first-time MI patients' moods after six months post-MI. The second aim was to examine the roles of first-time MI couples' illness perceptions on their own moods.

One hundred and twenty six first-time MI patients filled in the questionnaires during their hospitalisation, and 91 of them completed all three assessments during the first six months. Data from 42 first-time MI couples were also collected during the patients' hospitalisation. Thirty-five of the 42 MI couples completed all three assessments during the first six months. Therefore, information from 91 MI patients and 35 MI couples were used for longitudinal data analyses.

The results indicated that when comparing with healthy people, first-time MI patients reported higher levels of depression, state anxiety and negative affect. Those held negative illness perceptions (e.g., worse illness consequences, longer recovery time, and worse symptom perception) tended to feel more depressed or anxious. Hierarchical regressions indicated that symptom perception and illness consequence perception were two important contributors of these MI patients' moods. In addition, some types of coping strategies and mood variables were also important.

Data of MI couples indicated that spouses were also influenced by the MI event, and they reported higher levels of depression, state anxiety and negative affect. Those couples who both had negative illness perceptions of the MI tended to feel more negative. However, couples' moods did not significant correlate with each other. Hierarchical

regression further showed only their own illness perceptions and moods significantly contributed to their own moods. Their partners' illness perceptions and moods did not contribute to their own moods.

The finding suggested illness perceptions played important roles on MI patients' and spouses' moods. To improve moods, future studies should focus more on interventions of illness perceptions.

ABBREVIATION

ADL - Activities of Daily Living Scale

BDI - Beck Depression Inventory

BSSS – Blumenthal Social Support Scale

CABG – Coronary Artery Bypass grafting

CAD – Coronary Artery Disease

CAS – Control Attitude Scale

CESD – Centre for the Epidemiological Studies Depression-Scale

CHD – Coronary Heart Disease

CI – Confidence Interval

CIDI - Composite International Diagnostic Interview

CISS - Coping Inventory for Stressful Situation

CK – Creatine Kinase

CPLNI - Cardiac Patient Learning Needs Inventory

CQCP - Coping Questionnaire for Coronary Patients

CSM – Common Sense Model

CSQ - Coping Strategies Questionnaire

CSS – Crisis Support Scale

DASI - Duke Activity Status Index

DIS - Diagnostic Interview Schedule

DISH - Depression Interview and Structured Hamilton

DSM-IV-TR - Diagnostic and Statistical Manual of Mental Disorders, 4th Text revision

DSM-III-R - Diagnostic and Statistical Manual of Mental Disorders, 3rd edition revision

GCS- General Coping Questionnaire

GMS – Global Mood Scale

HADS - Hospital Anxiety and Depression Scale

HAMA - Hamilton Anxiety Rating Scale

HPPQ - Heart Patients' Psychological Questionnaire

HRSD (or HDRS) - Hamilton Rating Scale for Depression (Hamilton Depression Rating Scale)

HSCL - Hopkins Symptom Checklist

ICD-9 - International Classification of Diseases, ninth revision

IPQ (-R) – (Revised) Illness Perception Questionnaire

ISEL – Interpersonal Support Evaluation List

ISSB – Inventory of Socially Supportive Behaviours

ISSI – Interview Schedule of social Interaction

JCS - Jalowiec Coping Scale

KMO – Kaiser Meyer Olkin

LDIS - Levine Denial of Illness Scale

LVEF – Left Ventricular Ejection Fraction

MAACL - Multiple Affect Adjective Check List

MADRS – Montgomery-Asberg Depression Rating Scale

MCEQ - McNett Coping Effectiveness Questionnaire

MCS - McLeod Conflict Scale

MES – (Bech–Rafaelsen) Melancholia Scale

MHI - Mental Health Inventory

MI – Myocardial infarction

MOSSAS – Medical Outcomes Study Specific Adherence Scale

MSPSS – Multi-dimensional Scale of Perceived Social Support

MSQ-H – Multi-dimensional Support Questionnaire for Heart Patients

MUIS - Mishel Uncertainty in Illness Scale

NSSQ – Norbeck Social support Questionnaire

PAIS - Psychosocial Adjustment to Illness Scale

POMS – Profile of Mood States

PSS – Perceived Social Support Scale

PVC - Premature Ventricular Contractions

QLI – Quality of Life Index

QLMI – Quality of Life for Myocardial Infarction

RDC - Research Diagnostic Criteria

QoL – Quality of Life

SADS - Schedule for Affective Disorder and Schizophrenia

SCAND - Schedule for Assessment of Nueropsychiatric Disorder

SCI-DSM-III-R - Structured Clinical Interview for DSM III-R

SCL - Symptom Check List

SD – Standard Deviation

SE – Standard Error

SED - Semantic-differential questionnaire

SIP – Sick Impact Profile

SNI – Social Network Index

SNQ – Social Network Questionnaire

SRDS – (Zung's) Self-rating Depression scale

SSQ – Social Support questionnaire

STAI – (Spielberger's) State-Trait Anxiety Inventory

TOTE – Test Operate test Exist

WCQ - Ways of Coping Questionnaire

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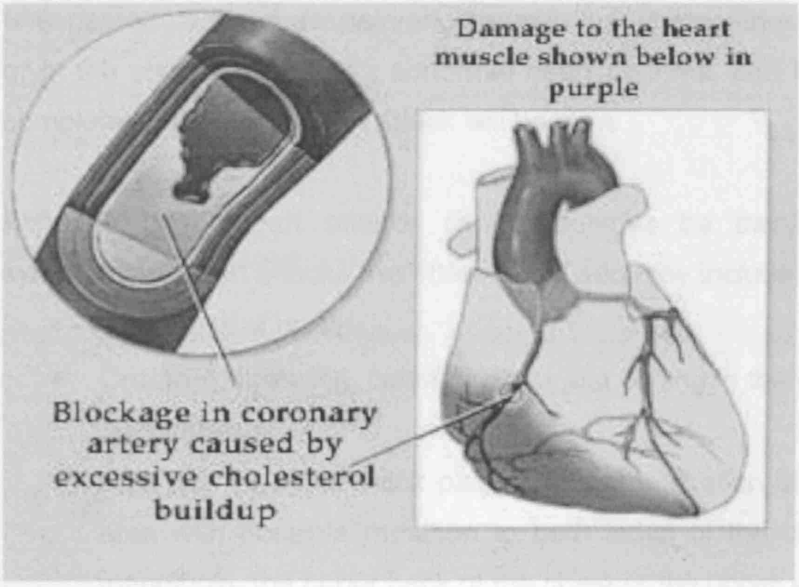
CHAPTER ONE – INTRODUCTION

1.1. What is a Myocardial Infarction (MI)?

A myocardial infarction (MI), commonly referred to as "heart attack", is the death of heart muscle from the sudden blockage of a coronary artery by a blood clot. The heart, like other organs, needs nutrition and oxygen from blood. Coronary arteries are the blood vessels that supply the heart muscle with these nutrients. A blockage of a coronary artery will deprive the heart muscle of blood and cause injury, which will induce chest pain and pressure. If the blood flow is not restored within 20 to 40 minutes, heart muscle will begin to die. The 'dying process' may last about 6-8 hours. After that, the dead heart muscle will be replaced by scar tissues.

Figure 1. 1. Illustration of myocardial infarction



MI is a major killer in the United Kingdom (UK). It accounts for 120,000 deaths a year. Around every two minutes, someone has a heart attack and over 270,000 people in the UK suffer a heart attack each year. In fact, more than 1.2 million people in the UK have had a heart attack (British Heart Foundation Statistics Database, 2003). Its financial cost was estimated £8.5 billion and its NHS cost was over £1.5 billion (Lowe et al., 2000).

1.2. What causes an MI and what are its symptoms?

Although MI often comes on suddenly, the run-up to it has taken years. In fact, MI is one of the 'products' of atherosclerosis. Atherosclerosis is a gradual process in which plagues (collections) of cholesterol are deposited in the walls of arteries and they cause hardening of the arterial walls and narrowing of the inner channel (lumen) of the artery (Cutting, 1998).

Atherosclerosis starts in childhood and can remain silent for years or decades, but the symptoms usually do not arise until later in adulthood when the arterial narrowing becomes severe. A number of factors, including demographic variables (i.e., age, males, family history of early atherosclerosis) and physical/behavioural variables (i.e., smoking, overweight, lack of exercise, high blood pressure/cholesterol, diabetes mellitus and stress) can accelerate its process. Once the arteries are too narrow to pass enough blood oxygen to the heart muscle, a number of heart diseases, which are categorised as Coronary Heart Disease (CHD), will develop. These diseases include MI, sudden unexpected death, chest pain/angina (pain that starts either across the front of the chest or in the shoulder/arm/jaw), abnormal heart rhythms, and heart failure. If any artery is completely blocked, a heart attack will happen.

Although small heart attacks can sometimes be painless (silent heart attacks), symptoms of heart attacks are often varied and may include the following:

- Shortness of breath,
- Crushing, pressing, constricting or just itching in the chest/arm for more than 15-30 minutes.
- Arm pain or upper back pain. The usual location of pain is the midretrosternal area with possible radiation to both sides of the chest, the left/right arm, the mandibula, the upper back of the chest or the upper abdomen,
- Anxiety, nausea, vomiting, and/or general epigastric (upper middle abdomen) discomfort
- Dyspnoea,
- Sweating,
- Heart burn and/or indigestion,
- General malaise (vague feeling of illness)
- Perspiration sometimes is present (Crawford et al., 2001).

1.3. What are the risk factors of MI?

As mentioned in section 1.2, some demographic variables (age, male sex and family history) and physical/behavioural variables can speed up the process of atherosclerosis. In the review of Krantz & McCeney (2002), physical/behavioural risk factors can be even divided into acute (acute exercise and acute cardiovascular reactivity, Muller et al., 1989; Strike & Steptoe, 2005) and chronic factors (smoking, high cholesterol, hypertension, lack of exercise, diabetes). In addition, psychological risk factors have also been suggested (Frasure-Smith et al., 1993; 1995ab; 1999; 2000ab; Lane et al., 2000ab, 2002ab; Strike & Steptoe, 2005). Acute psychological risk factors include sudden provoked anger and acute mental stress. Episodic psychological risk factors include depression, anxiety, and chronic psychological risk factors include low economic status, unhealthy lifestyles, low social support and personality (hostility and anger expression) (Barefoot et al., 2003). A recent systematic review and meta-analytic study (Van der Kooy et al., 2007) also reported that depression, particularly clinical depression was an important risk factor for developing MI and other cardiovascular diseases and its importance equals the risk of smoking (Luoto, 1984) and diabetes (Tavani et al., 2002).

1.4. Treatment and Management of MI

1.4.1 The acute phase treatment

At the early onset of MI, the most important thing for the patient is to seek medical help. This is because most deaths associated with acute MI occurred within the first hour of the onset due to ventricular fibrillation (Antman & Braunwald, 1997). When treating patients in hospital, doctors' priority is to quickly open the blocked artery and restore blood flow to the heart muscle for oxygen, a process called "reperfusion". If the treatment condition is suitable, patients are often given thrombolytic therapy to break down blood clots in the arteries/veins. Once the artery is open and oxygen is re-supplied, damage to heart muscle will cease and the pain will stop.

To investigate and to decide the area/size of the infarct, a 12-lead electrocardiogram, laboratory examinations and imaging information are needed. The new pathological Q-waves on the electrocardiogram, elevated creatine kinase (CK) (e.g. a peak creatinine phosphokinase (CK) level greater than 1.5X the normal limit, or a CK-MB (the myocardial isoenzyme of CK) value exceeding the normal limit), and echocardiogram can provide detailed information about the infarct.

1.4.2. The long-term management and treatment

After the acute phase treatment, MI patients will mainly receive non-invasive treatments including drug therapy to prevent blood clots and abnormal heart rhythms. Cardiac education is also included to empower patients for better self-management and decreasing the possibility of future MI/cardiac events.

In the United Kingdom, cardiac rehabilitation programmes are often offered in hospital as part of the standardised services, although some patients may decide not to participate in this. Cardiac rehabilitation programmes are designed to provide information about the heart, medication, exercise and diet. Through rehabilitation courses, MI patients are encouraged and expected to improve their lifestyles and behaviours to reduce the possibility of having another MI and increase their confidence and quality of life.

For those patients with a severe heart attack, invasive therapy may be further offered. Typical invasive treatments include angioplasty (using a guide wire and balloon catheter to reperfuse the infarct vessel) and coronary artery bypass grafting (CABG, a type of surgery which re-routes, or "bypasses," blood around clogged arteries to improve blood flow and oxygen to the heart).

CHAPTER TWO –MI PATIENTS' EMOTIONAL RESPONSES

"Every affection of the mind that is attended with either pain or pleasure, hope or fear is the cause of an agitation whose influence extends to the heart..." (Harvey, 1628)

When doctors explain to a patient that he/she has had a heart attack, it is understandable that this person will have negative emotional responses. In earlier studies, depression, state anxiety, hopelessness, and vital exhaustion have been found in MI patients (Frasure-Smith et al., 1993, 1995ab, 1999, 2003; Lane et al., 2000ab, 2002ab). Of these responses, depression and state anxiety are the two most common negative moods (Frasure-Smith et al., 1999; 2000ab; Lane et al., 2000ab, 2002ab).

Post-MI depression and state anxiety not only are regarded as indices of MI patients' psychological wellbeing, they have also been found to serve as important predictors of MI patients' mortality, morbidity, quality of life, returning to work, changing lifestyles and attending cardiac rehabilitation (Januzzi et al., 2000). Accumulative evidence also shows that depression and state anxiety before MI onset can increase the risk of MI (Rugulies, 2002). In addition, it has been found that disease severity is not related to depression and anxiety (Denollet et al., 1996; 1998; Frasure-Smith et al., 1995ab; Hemingway & Marmot, 1999; Schleifer et al., 1989; Strik et al., 2004). Given the importance of depression and state anxiety, it is vital for researchers to examine prevalence of these two negative moods and what factors may influence them.

As no previous studies have specifically tried to distinguish the psychological responses of first-time MI patients and those have previous MI, one cannot strongly suggest differences between these two groups of patients. However, it seems logical to assume that emotionally and cognitively, these two groups may respond differently to their MI events. To focus more on homogeneous participants, this study only recruited first-time MI patients. Although past studies that were related to first-time and non first-time MI patients were both reviewed together, emphasis was laid on first-time MI.

2.1. Depression

2.1.1. What is depression?

Depression is a type of mental state, which is characterized by a pessimistic sense of inadequacy and lack of action. Other common symptoms of depression also include subjective feelings of fatigue, weakness, lack of energy, sleep disturbances, and sadness (Degre-Coustry & Grevisse., 1982). In summary, depression symptoms can include physical, behavioural/attitude, and emotional aspects.

Everyone experiences depressed mood at sometime in his or her life. It is common to hear someone say "I am depressed" or "You look depressed". However, one should be aware that like other moods, depression is a continuous mood state. When two people both report depressed, the levels of their depression can be different. In normal situations, depressed mood does not severely interrupt one's daily life. However, if daily life is seriously interrupted by depressed mood, then "depression" can become an illness, and medical experts often call it "depressive disorder". Therefore, one should understand the differences between common depressed mood (depressive symptoms or depressive symptomatology) and depressive disorders.

Depressive disorders are psychiatric diagnoses in which a person's depressive symptoms have influenced his/her daily life functions. Depressive symptoms (or symptomatology) refer to the presence of depressive symptoms but without fulfilling the diagnostic criteria of depressive disorders (Dobbels et al., 2002). To determine whether depression has influenced daily life functions, symptom "*frequency*", "*severity*" and "*duration*" are three diagnostic dimensions. Currently, there are three major classification systems of depressive disorders: the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000); the *International Classification of Diseases*, ninth revision (ICD-9, World Health organisation, 1977); and the *Research Diagnostic Criteria* (RDC) (Spitzer et al., 1978). Among these three diagnostic systems, DSM is the most widely used system for diagnosing depressive disorders and it has been continuously revised since its first publication in 1952.

According to DSM-IV-TR, depressive disorders include two main categories: major depressive disorder and dysthymic disorder (a chronic depression condition lasting for at least 2 years). Because major depressive disorder is the most commonly observed co-morbid psychiatric disorder in cardiovascular disease (Davidson et al., 2005; Dobbels

et al., 2002) and dysthymia is persistent depressed mood for at least 2 years, this section will only review depressive disorder.

Major depressive disorder contains one of (a) symptoms in Table 2.1 for at least two weeks in addition to at least five of (b) symptoms in Table 2.1. The more symptoms a person has, the more severe the major depressive disorder. However, differences between mild/minor depressive disorder and depressive symptoms are not always clear (Dobbels et al., 2002).

Table 2. 1 Diagnosis of symptoms and severity of depressive disorder (APA, 2000)

Depressive Symptomatology	
(a)	Depressed, sad mood most of the day Markedly decreased interest or pleasure in almost all activities, most of the day
(b)	Insomnia or hypersomnia nearly every day Psychomotor retardation or agitation Changes in appetite; unintentional weight gain or loss Fatigue or loss of energy nearly every day Guilt Concentration and memory problems Recurrent thoughts of death (not just fear or dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide
(c)	Symptoms are present for at least 2 weeks
(d)	The symptoms are not due to the direct physiologic effect of a substance or a general medical condition
(e)	The symptoms cause clinically significant distress or impairment
(f)	The symptoms are not better accounted for by bereavement
Severity of depressive disorder	
Severe/major depression	≥ 1 of *a* + ≥ 5 of *b*
Moderate depression	≥ 1 of *a* + ≥ 3 of *b*
Mild/minor depression	≥ 1 of a + ≥ 2 of *b*

Cited from Dobbels et al. (2002) and Lesperance & Frasure-Smith (2000)

Depressive disorders are one of the most common mental illnesses around the world. According to the American National Institute of Mental health in 2001, about 19 millions (more than 5%) of American adults had depressive disorders. In the same year, Ayuso-Mateos et al. (2001) reported that around 8.5% people in five European countries had depressive disorders (10% for women and 6.6% for men). Recently, a WHO World Health Survey by Moussavi et al. (2007) studied 245404 participants from 60 countries and reported that between 9.3% to 23% of the participants who had one or more chronic physical diseases also had co-morbid depression. Besides, after adjusting for socioeconomic factors and health conditions, depression was found to have the largest effect on worsening mean health scores compared with other chronic conditions.

2.1.2. How is depression measured?

Structured and semi-structured interviews are the main approaches to diagnose major depressive disorder, providing properly trained administers conduct the interviews. The "Structural Clinical Interview for DSM" (SCID, First et al., 1995; Spitzer et al., 1987; 1992; Williams et al., 1992) is the gold standard for clinicians to diagnose depressive disorders. However, because of time (normally takes 60-90 minutes) and expenses required to administer a clinical interview, epidemiologic-type studies often use clinical interviews which were designed for administration by lay interviewers (i.e., Composite International Diagnostic Interview (CIDI), Kessler et al., 1994, WHO, 1990, Wittchen, 1994; or the Diagnostic Interview Schedule (DIS), Robins et al., 1981).

Clinician-completed rating scales (e.g., Hamilton Depression Inventory, or Hamilton Rating Scale for Depression, Hamilton, 1967) are the second option for screening of major depressive disorder. However, these scales are mainly used to measure response to depression treatment or depression severity in patients who are already diagnosed with a major depressive disorder.

The third options are self-report instruments for screening depressive symptoms. Self-report instruments were never intended to be used as a diagnostic instrument. Some researchers suggest that certain questionnaires may serve to assess possible depressive disorders so the patient can be referred to further specialised services. However, these scales must be validated in relation to diagnostic interviews and cut-off points. (Bowling & Ebrahim, 2005; DeVellis, 1993; Rodin et al., 1991).

Table 2.2 summarises professional interviews and some validated depression scales that have been used in cardiac research, including self-report and clinician-completed instruments.

Table 2. 2 A list of depression measure tools used in cardiac research

Questionnaire and authors	Scores	Suggested cut-off criteria	Note
Beck Depression Inventory (BDI, Beck et al., 1961, 1987ab, 1988, 1996)	21 items, range 0 – 63, self-rated or by health professionals	0 - 9: no or minimal depression 10–18: mild-to-moderate depression 19–29: moderate-to-severe depression > 30: severe depression Ps. a score of 0–4 may suggest possible denial of depression and a score of 40–63 may suggest possible exaggeration of depression or a histrionic or borderline personality disorder	Cons - containing items related to physical symptoms which may be caused by physical illness, not depression Ps. BDI-II (Beck et al., 1988) Short BDI has 13 items ranged from 0-39 (Scogin, 1988) with cut-off ≥ 5
Bech–Rafaelsen Melancholia Scale (MES, Bech, 2002)	11 items, range 0 – 44 Clinician-rated scale	< 6: normal 6 – 9: mild depression 10 – 15: moderate depression > 15: major depression	Used for screening
Centre for Epidemiological Studies Depression-Scale (CES-D, Radloff, 1977)	20 items, range 0 – 60 self-rated	< 16: normal 16 – 20: mild depression 21 – 30: moderate depression 31 – 60: severe depression	Used for screening general population
Composite International Diagnostic Interview (CIDI, Kessler et al., 1994)	Clinical interview	X	Used for diagnosing depressive disorders
Depression Interview and Structured Hamilton (DISH, Freedland et al., 2002)	Semi-structured interview Clinician-rated	X	Designed for medically ill patients (validated on cardiac patients)
Diagnostic Interview Schedule (DIS, Robins et al., 1981)	Clinical interview	X	Used for diagnosing depressive disorders
Hamilton Rating Scale for Depression (HRS-D, Hamilton 1967)	17 items, range 0 – 50 Clinician-rated scale	10 – 13: mild depressive symptoms (or normal) 14-17: mild to moderate depressive symptoms 18 – 24: moderate depression > 25: severe depression	This scale is used for patients already diagnosed with clinical depression and the clinicians used this scale to quantify interview results
Hospital Anxiety Depression Scale (HADS, Zigmond & Snaith, 1983)	7 items for each subscale range 0 – 21, self-rated	≤ 7: normal 8 – 10: mild or suggestive symptoms (borderline clinical case) 11 – 14: moderate symptoms (clinical case) ≥ 15: severe symptoms	Used for screening HDS could be an unreliable in elderly people with physical illness, as the major variance in the scores is due to anxiety and insomnia. (Hammond, 1998)
Major Depression Inventory (MDI-10, Olsen et al., 2003)	10 items, Range 0 – 50 Clinician-rated	Using ICD-10 or DSM-IV as the guideline – ICD-10 mild – 2 of the first 3 + 2 of the first 7 items ICD-10 moderate – 2 of the first 3 + 4 of the first 7 items ICD-10 severe – all first 3 + 5 of the first 7 items DSM-IV major depression – 1 of the first 2 + 5 of the first 9 items	Can be used for screening in general population
Montgomery-Asberg Depression Rating Scale (MADRS, Montgomery & Asberg, 1979)	10 item checklist, range 0 – 60, clinician-rated	very severe ≥ 44; severe 31 – 43; moderate 25 - 30; mild 15 - 24; recovered, 7 Ps. sometimes 7 – 19 = mild; 20 – 34 = moderate 35 upwards = severe (Silverstone, 1990a) 1986 (Snaith, 1986): 0 – 6: no depression 7-19 mild depression; 20-34 moderate depression; > 34 severe depression	Originally designed to detect changes in trial of antidepressant medicine
Patient Health Questionnaire ((PHQ-9, Kroenke et al., 2001)	9 items, range 0 – 27, self-rated	0-4: no depression 5-9: mild 10-14: moderate 15-19: moderately severe depression ≥ 20: severe depression	Used for screening
Present State Examination (PSE, Wing et al., 1974)	Clinical interview	X	Used for diagnosing depressive disorders
Research Diagnostic Criteria (RDC, Spitzer et al., 1978)	Clinical interview	X	Used for diagnosing depressive disorders
Schedule for Affective Disorder and Schizophrenia (SADS, Endicott & Spitzer, 1978)	Clinical interview	X	Used for diagnosing depressive disorders
The Schedule for Assessment of Neuropsychiatric Disorder (SCAND, WHO, 1996)	Clinical interview	X	Used for diagnosing depressive disorders
Structural Clinical Interview for DSM (SCID, Spitzer et al, 1987, 1992; First et al., 1995)	Clinical interview	X	Used for diagnosing depressive disorders
Symptom Check List-90-R (Derogatis et al., 1973; Arrindell, 1981)	13 out of 90 items were for depression, self-rated	X	Designed for research screening purpose
The Trauma Symptom Checklist (TSC, Briere, 1989)	33-items measuring 5 subscales including depression (9 items), range from 0 – 27	X	The five subscales include dissociation, anxiety, depression, post-sexual abuse trauma-hypothesised, sleep disturbance
Zung's Self-Rating Depression Scale (SRDS, Zung, 1965)	20 items, range 20 – 80 self-rated	< 50: normal 50 – 59: minimal to mild depression 60 – 69: moderate to marked depression > 69: severe to extreme depression (Ps. Based on adults aged 20-64)	Used for screening
Havik & Maeland's SED (1990)	Contains 3 subscales, 16 items, range 12-84, self-rated	Cut off point: based on 37 psychiatric patients and used one standard deviation. Depression = 15 (Ps. Anxiety = 14; irritability = 9, total score = 43)	

2.1.3. What is the relationship between depression and MI?

To review the relationships between MI and depression, published articles were searched in PsycInfo and Medline databases for the period from 1970 to 2007. The searching key words and recruitment criteria of reviewed articles are listed in Appendix A-1. Studies that examined not only MI but also other types of CHD patients were excluded.

2.1.3.1. Severity and prevalence of post-MI depression

The reviews of cross-sectional and longitudinal studies on depression prevalence are attached in Appendix A-9 and Appendix A-10, respectively. In order to examine to what extent that MI patients suffered from depression, Table 2.3 summarises studies that examined MI patients during their hospitalisation. Table 2.4 summarises longitudinal studies on MI patients. An 'X' in Table 2.4 means that an assessment was conducted at that time-point, but information related to depression prevalence was not reported.

Table 2. 3. The prevalence of MI patients' depression during hospitalisation

Authors	1st MI or not	Sample	Depression measure and cut-off criteria	Measure time after admission	Mean depression and/or depression prevalence (%)
Sorensen et al. (2006)	Mixed (15% > 1 MI)	761 (76% men) Age limit < 76	Depressive disorder: MDI (unknown cut-off)	At discharge (mean 7 days)	9.6% (37 men and 36 women)
Kaufmann et al. (1999)	Mixed (23% > 1 MI)	331 (65.6% men) age = 65 ± 12.1 (range 28-92) (4% had pre-MI depression)	Depressive disorder: DIS interview ≥ 5	3 – 15 days	27.2%
Watkins et al. (2002)	Mixed (22% > 1 MI)	207 (58.4% men)	Depressive disorder: DIS interview (BDI ≥ 10)	6 ± 3 days	DIS: 18%
Travella et al. (1994)	Mixed (60% > 1 MI)	70 (75.7% men), Age = 58.6 ± 11.4 (37% had psychiatric medication)	Depressive disorder: PSE based on DSM-III (Wing et al., 1974) HRDS (for severity, Hamilton, 1960)	Hospitalisation	29% (26% major, 3% dysthymia)
Schleifer et al. (1989)	Mixed (27% > 1 MI)	T1: 283 (64% men); age = 63.7 ± 0.7	Depressive disorder: 1. SADS (Endicott & Spitzer, 1978) 2. RDC (Spitzer et al., 1978) Both unknown cut-off for depressive disorder	8-10 days	45% (18% major, 27% minor)
Carney et al (2003)	Mixed (21% > 1 MI)	766 (60.4% men) Depressed age = 56.76 ± 12.7 Non-depressed age= 60.89 ± 10.91	Depressive disorder: DISH interview (professional judgement) Depressive symptoms: BDI ≥ 10	28 days	DISH: 46.7% (21.3% major, 25.4% minor)
Fauerbach et al. (2005)	Mixed (24% > 1 MI)	196	Depressive disorder: SCID interview Depressive symptoms: BDI ≥ 10	2-5 days	SCID: 13.2% (26 patients) BDI ≥ 10: 16.8% (33 patients) Total: 22.4%
Romanelli et al. (2002)	Mixed (36% > 1 MI)	153 (55.6% men) Age > 65 Mean age = 74.5 ± 1.2	Depressive disorder: SCID interview Depressive symptoms: BDI ≥ 10	3 – 5 days	SCID: 13.7% BDI ≥ 10: 17.6% Ps. 22.9% had either SCID or BDI ≥ 10 8.5% (13 patients) had both
Bush et al. (2001)	Mixed (30% > 1 MI)	267 (58% men) age = 64.8 ± 11.8 (17.7% had pre-MI depression)	Depressive disorder: SCID interview Depressive symptoms: BDI ≥ 10	2-5 days	SCID: 17.2% BDI ≥ 10: 19.9% Total mood disorder and/or BDI ≥ 10: 27.3%
Frasure-Smith et al. (1993,1995ab)	Mixed (37% > 1MI)	222 (78% men) Mean age = 60 (26.8% had pre-MI depression)	Depressive disorder: DIS interview Depressive symptoms: BDI ≥ 10	5-15 days	DIS: 15.8% BDI ≥ 10: 31.2%
Barefoot et al. (2003)	Mixed (25% > 1 MI)	196 (63% men) (35% had pre-MI depression) Mean age = 60.8	Depressive disorder: HRDS (unknown cut-off) Depressive symptoms: BDI – minor:10-15 Moderate: 16-23 Severe: 24-63	Hospitalisation	HRSD: 28% BDI ≥ 10: 37%
Watkins et al. (2003)	Mixed (17% > 1 MI) (75% had > 1 co-morbidity)	2481 (56% men) Age = 61 ± 13 (20 – 97)	Depressive disorder: DISH interview & HRSD – Minor: 14 – 17 Major: ≥ 18 Depressive symptoms: BDI - Minor: 10 – 18; Major: ≥ 19	28 days	HRSD: 73% (38% major, 35% minor)
Fogel et al. (2004)	Mixed (30.7% > 1 MI)	285 (57.2% men)	BDI ≥ 10	2-5 days	BDI ≥ 10: 19.6%
Luutonen et al. (2002)	Mixed	85 (76.5% men) Mean age = 60.7 ± 10.5 (age < 74)	BDI ≥ 10 (Mild to moderate: 10-18 Moderate to severe: 19-29; Severe: > 29)	Hospitalisation	BDI ≥ 10: 21.2% (10-18: 15.3%, BDI > 18: 5.9%)
Kaptein et al. (2006)	Mixed	475 (81% men) mean age = 60.6	BDI ≥ 10	Hospitalisation	BDI ≥ 10: 22.7% (If based on BDI > 19, depression = 2.9%)
Spijkerman et al. (2006)	Mixed (13.6% > 1 MI)	494 Age = 60.5 ± 11.7	BDI ≥ 10	In hospital – 227 After discharge – 267 (1-68 days)	BDI ≥ 10: 23.7%
Ziegelstein et al. (2005)	mixed	60 (60% men) age: 66.5 ± 12.8	BDI ≥ 10	2-5 days	BDI ≥ 10: 30%
Frasure-Smith et al. (2000a)	Mixed (32.3% > 1 MI)	848 (68.8% men)	BDI ≥ 10	Hospitalisation	BDI ≥ 10: 30.7%
Lane et al. (2000ab; 2001a, 2002a)	Mixed (21% > 1 MI)	288 (74.7% men) (3% had pre-MI depression) (52% with cardiac failure); age = 62.7 ± 11.5	BDI ≥ 10	2-15 days	BDI ≥ 10: 30.9% (mean = 7.7 ± 6.3)
Frasure-Smith et al. (2000b)	mixed	887	BDI ≥ 10	7 days	BDI ≥ 10: 32%

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(Continued)

Authors	1st MI or not	Sample	Depression measure and cut-off criteria	Measure time after admission	Mean depression and/or depression prevalence (%)
Frasure-Smith et al. (1999); Lesperance et al. (2002)	Mixed (23.6% > 1 MI)	896 (68.4% men) age = 59.4 ± 11.2	BDI ≥ 10	Hospitalisation	BDI ≥ 10: 32.3% (10 – 18: 23.5%, > 18: 8.8%) (men: 25.6%, mean = 7.1 ± 7.1) (women: 47%, mean = 11.3 ± 9.3)
Lauzon et al. (2003)	Mixed (21% > 1 MI)	550 (79% men)	BDI ≥ 10	2-3 days	BDI ≥ 10: 35%
Steeds et al. (2004)	Mixed	131	BDI-II ≥ 12	5-7 days hospitalisation	BDI ≥ 12: 47%
Cherrington et al. (2004)	Mixed	49 (49% men) age = 60.8 ± 13.32	BDI-II: mild: 14-19 moderate: 20-28 severe: 29-63	2-4 days	BDI ≥ 14: 28.5% (Mild = 16.3%, Moderate = 6.1%, Severe = 6.1%)
Norris et al. (2007)	Mixed (7% > 1 MI)	486 (79% men) Men age = 59 Women age = 66 (no age limit)	BDI II ≥ 14 (Moderate depression: 14-28, Severe depression: 29-63)	Hospitalisation	BDI ≥ 14: Men: 32.7% (30.2% moderate; 2.5% severe) Women: 40.3% (37.9% moderate; 2.4% severe)
Kamm-Stegelman et al. (2006)	Mixed	59 women age = 52.8 ± 8.48 (36-64)	BDI-II ≥ 14 (Mild: 14-19, Moderate: 20-28 Severe: ≥ 29)	On the day of discharge	BDI ≥ 14: 49%
Parashar et al. (2006)	Mixed	2096	PHQ-9 ≥ 10	Hospitalisation	PHQ-9 ≥ 10: 20.6%
Mallik et al. (2006)	Mixed (21.5% > 1 MI)	2496 (67.4% men) (6% had depression history)	PHQ-9 ≥ 10	0-53 days	PHQ-9 ≥ 10: 22.3% (men: 19.1%; women: 29.1%)
Barry et al. (2007)	Mixed (19.8% > 1 MI)	1847 (68.8% men) Age = 60.6 ± 12 (no age limit)	PHQ-9: ≥ 5 (mild: 5-9, moderate: 10-14 moderately severe depression: 15-19 severe depression ≥ 20)	Hospitalisation	PHQ-9 ≥ 5: 46% (Severe: 2.3%)
Berkman et al. (1992)	Mixed (35% > 1 MI)	194 (51% men) Age limited > 64	CESD ≥ 16	Hospitalisation	CESD ≥ 16: 17%
Brummett et al. (1998)	mixed	620 (more than 68% men) Age = 63.4 ± 11.4 (36-93)	CESD ≥ 16	Hospitalisation	CESD ≥ 16: 34.7% (Mean depression = 15.66 ± 11.37)
Brink et al. (2002a) (2005)	**Yes**	114 (67.5% men) Age (M) = 65.4 ± 10.1 Age (W) = 72.2 ± 8.6	HADS-depression – Possible depressed/anxious: ≥ 8 Probable anxiety/depression: ≥ 11	1-2 days before discharge	HADS ≥ 8: 11.4% (7.8% had probable depression or anxiety)
Martin et al. (2003)	mixed	335 (67% men) Mean age = 67.4 ± 11.8	HADS-depression ≥ 8 and ≥ 11	1 week	HADS ≥ 8: 15% (HADS ≥ 11: 6%)
Mayou et al. (2000)	Mixed (22% > 1 MI)	344 (73% men) age = 63.16 (30-79)	1. HADS-depression ≥ 8 (Borderline: 8-10) (Probably clinical depression: > 10) 2. Emotional disorder (distressed): using HADS-depression ≥ 11 or combined HADS ≥ 20	3 days	HADS ≥ 8: 17.5% (Borderline: 9.9%, probable clinical depression: 7.6% If using threshold of 19, 14.8% were probably emotional disorder.
Bennett et al. (1999ac)	**Yes**	43, age < 75	HADS combined ≥ 11 (combined depression and anxiety scores)	Hospitalisation	HADS ≥ 11: 11.6%
Dickens et al. (2004b; 2005)	**Yes (14% had angina)**	314 (63.4% men) age = 57.6 4 ± 11.2	1. HADS combined ≥ 17 2. The Schedule for Clinical Assessment in Neuropsychiatric Disorder (SCAND, WHO, 1996) – using ICD-10 as diagnostic criteria	3-6 days	HADS ≥ 17: 30.3% SCAN: 21% met ICD-10 for depressive disorder (1 month before MI onset)
Gilutz et al. (1991)	**Yes**	186 (87 Israeli & 98 Swedish)	Holland Sgroi Anxiety Depression Scale & the Hackett-Cassum Denial Scale (Froese, 1974) – unknown cut-off point	Hospitalisation	Swedish – 45.9% mild; 11.2% moderate/severe Israeli – 31% mild; 34.7% moderate/severe
Silverstone et al. (1990a)	mixed	100	MADRS Mild: ≤ 7 Moderate: 8 – 20 Severe: >20 (sometimes use 7 – 19 = mild; 20 – 34 = moderate)	Hospitalisation	If using cut-off = 7: 59% Cut-off = 14: 41% Cu-off = 21: 19%
Stern et al. (1977)	mixed	68 (80.9% men) mean age = 53	Zung's SRDS ≥ 40	Hospitalisation	SRDS ≥ 40: 22%
Havik & Maeland (1990)	mixed	T1: 383 T2: 283	SED (Havik, 1982) ≥ 15	T1: 9 days T2: before discharge	SED ≥ 15: T1: 19%; T2: 13%

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Table 2. 4. The persistence of MI patients' depression and depression prevalence over time

Authors	1st MI or not	Sample	Depression measure & cut-off	In hospital (%)	≤ 1 months post-discharge (%)	1-3 months post-discharge (%)	3-6 months post-discharge (%)	6-12 months post-discharge (%)	>12 months post discharge (%)	Persistence and prevalence of depression
Travella et al. (1994)	Mixed (60% > 1 MI)	T1: 70 (75.7% men), Age = 58.6 ± 11.4 (37% had psychiatric medication) T2: 26; T3: 33; T4: 29; T5: 31	DSM-III - PSE & HRDS interview	29% (26% major, 3% dysthymia)		19% (15% major, 4% dysthymia)	24% (21% major, 3% dysthymia)	9-months - 31% (28% major, 3% minor)	1-year – 29% (16% major, 13% dysthymia)	Of those had major depression at T1, median duration of major depression was 4.5 months (1.5-12 months). Those with prolonged depression (>6 months) had more anxiety symptoms at T1
Schleifer et al. (1989)	Mixed (27% > 1 MI)	T1: 283 (64% men, age = 63.7 ± 0.7) T2: 171 (60% men)	1. SADS (Endicott & Spitzer, 1978) 2. RDC (Spitzer et al., 1978) interview	Total: 45% Minor: 27% Major: 18%		Minor: 18% Major: 15%				17% of T1 non-depressed became depressed (11% minor, 6% major), 36% of T1 minor depressed were depressed (22% minor & 14% major) 77% of T1 major depressed were depressed (33% minor & 44% major).
Van Melle et al. (2007)	Mixed	2177	CIDI interview			CIDI: 17.2%				
Strik et al. (2001ab, 2004)	**Yes**	206 (75.7% men) (5.4% had pre-MI depression) Men = 59 ± 10.6; women = 62.9 ± 10.7	SCID-IV-R (T1 – T4) BDI ≥ 10, HADS ≥ 7, SCL-90 ≥ 22 (T2 – T4)		SCID: 18.9% (11.1% major; 7.8% minor)	X	X	X (9 & 12 months)		SCID-IV-R: Total new depression cases within 1-year (major/minor) = 31%, with the highest incidence rate at T1 (14.4%). Percentage of minor depression was higher from 3-12 months than major BDI: Over the year, total 52.7% new depression cases
Barefoot et al. (2003)	Mixed (25% > 1 MI)	T1 & T2: 196 (63% men) 35% with depression history Mean age = 60.8	HRSD BDI ≥ 10 (10-15 = minor, 16-23 = moderate, 24-63 = severe)	HRSD: 28% BDI ≥ 10: 37%.	HRSD: 17% BDI ≥ 10: 27%					BDI: at T2, 27% improved, 13% worsened, 59% remained depressed from T1. Mean BDI decreased significantly ($p < 0.001$) HRSD: at T2, 75% remained depressed from T1 , 16% improved & 9% became more depressed. Mean HRSD decreased significantly ($p < 0.003$)
De Jonge et al. (2006b)	Mixed (18.8% > 1 MI)	468 (55.4% had pre-MI depression)	T2 & T4: CIDI interview	X		X	X	X		Between T1-T3: 25.4% depressed. (44.5% of them were new cases)
De Jonge et al. (2006a)	Mixed (14.3% > 1 MI)	421 (43.4% of depressed MI had pre-MI depression)	BDI (T1 – T4) (mild: 10-19,moderate: 20-29, severe > 29) CIDI (T2 – T4)	X		X	X	X		Between T1-T3: CIDI - 25.5% depressed BDI – Mild 72.6%; Moderate 18.9%; Severe 8.5% Persistence of depression – CIDI: 34% out of CIDI depression (106 patients) lasted from T1 to T4 BDI: 36.8% depression lasted less than 3 months, 46.2% depression lasted 3-9 months 17% depression lasted for more than 9 months

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Authors	1st MI or not	Sample	Depression measure & cut-off	In hospital (%)	≤ 1 months post-discharge (%)	1-3 months post-discharge (%)	3-6 months post-discharge (%)	6-12 months post-discharge (%)	>12 months post discharge (%)	Persistence and prevalence of depression
Romanelli et al. (2002)	Mixed (36% > 1 MI)	T1: 153 (55.6% men) Mean age = 74.5 ± 1.2 (age > 65) T2: 101	BDI ≥ 10 SCID interview	22.9% (combined BDI ≥ 10 and positive SCID)			18.8% (combined)			Depression remained stable over 4 months
Denollet et al. (2006)	Mixed	176 (76% men) Age = 60.1 ± 10.7	SCID & HRDS > 17 BDI ≥ 10 (SCL-90, HADS, SADI, Denollet, 2006)		SCID: 18% BDI: 21%					
Frasure-Smith et al. (1993,1995ab) Lesperance et al. (1996)	Mixed (37% > 1 MI)	T1: 222 (78% men) (26.8% had pre-MI depression) T2 – T3: 170	DIS – DSM-III-R BDI ≥ 10	DIS: 15.8% major BDI: 30.6%			DIS: 20.6% new cases of depression at T2	DIS: 3% new cases of depression at T3		
Kaptein et al. (2006)	Mixed	475 (81% men) mean age = 60.6	T1 – T4: BDI ≥ 10, BDI ≥ 20 T2 & T4: CIDI	BDI ≥ 10: 22.7% BDI> 19: 2.9%		BDI≥ 10: 23.8% BDI> 19: 4.8%	BDI> 9: 25.5% BDI> 19: 4.9%	BDI≥ 10: 24.8% BDI> 19: 5.5%		BDI: depression was stable over 12 months CIDI: 25.2% major depressive disorder between T1-T3 56.4% had no depressive symptoms, 25.7% mild depressive symptoms, 9.3% moderate and increasing depressive symptoms, 4.6% significant but decreasing depressive symptoms, 4% significant and increasing depressive symptoms.
Lane et al. (2000ab; 2001a, 2002a)	Mixed (21% > 1 MI)	T1: 288 (74.7% men, 3% had pre-MI depression, 52% with cardiac failure); age = 62.7 ± 11.5 T2: 199; T3: 188	BDI ≥ 10	30.9%			37.7%	37.2%		Depression was stable over 12 months T1-T2-T3 depression highly correlated
Frasure-Smith et al. (2000b)	Mixed	T1 & T2: 887	BDI ≥ 10	32%				X		Those depressed at T1 had a significant decline at T2 (1 year) for about 5 points. The non-depressed at T1 had an increase of 1 point ($p < 0.0001$)
Lauzon et al. (2003)	Mixed (21% > 1 MI)	T1: 550 (79% men) T2: 466; T3: 464; T4: 486	BDI ≥ 10	35%	39%		39%	30%		Depressed patients at T1 tended to be depressed at T2 (70% were still depressed at 1 year) Mean depression score remained stable over 12 months Depression persistence remained stable

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Authors	1st MI or not	Sample	Depression measure & cut-off	In hospital	≤ 1 months post-discharge	1-3 months post-discharge	3-6 months post-discharge	6-12 months post-discharge	>12 months post discharge	Persistence and prevalence of depression
Luutonen et al. (2002)	Mixed	T1: 85 (65 men, 72.4%) Mean age = 60.7 ± 10.5 (age < 74) T2: 79; T3: 68	BDI ≥ 10 (Mild: 10-18, moderate: 19-29, severe: > 29)	Total: 21.2% Mild: 15.3% Moderate-severe: 5.9%			Total: 30% Mild: 15% Moderate-severe: 15%		Total: 33.9% Mild: 22.1% Moderate-severe: 11.8%	Mean depression increased over 18 months (p = 0.01) 47.8% were depressed at T1 & T3 21.4% of T1 depressed were free at T3.
Norris et al. (2007)	Mixed (7% > 1 MI)	486 (384 men, 79%) Men age = 59; Women age = 66	BDI-II Moderate: 14-28 Severe: 29-63	Men: 32.7% Moderate: 30.2% Severe: 2.5% Women: 40.3% Moderate: 37.9% Severe: 2.4%				Men: 31.9% Moderate: 29.8% Severe: 2.1% Women: 40.4% Moderate: 36.4% Severe: 4%		
Steeds et al. (2004)	Mixed	T1: 131	BDI-II BDI ≥ 12	47%		X	X			For those scored more than 12 at admission, their mean depression score decreased from T1 to T2 by 4.6 points (p < 0l01) and at 6 months by 3.3 points (p = 0.02).
Crowe et al. (1996)	Mixed (17% > 1 MI)	201 (88% men),	Short BDI: Mild: ≥ 5 mild Moderate: ≥ 8	X				X		Mean BDI decreased from 4 to 3 by 14 weeks and then remained stable till T2 (12 months) 10% moderate to severe between T1-T2.
Mayou et al. (2000)	Mixed (22% > 1 MI) (29% angina)	T1: 344 (73% men) age = 63.16 (30-79) T2: 243; T3: 224	HADS > 7 (Borderline: 8-10) (Probably clinical: > 10) Emotional disorder (distressed): HADS-depression > 10 or combined HADS >19	Total: 17.5% Borderline: 9.9% Probably: 7.6% If HADS> 19 - Emotional distress: 14.8%		X		X		Depression was stable over 12 months (Depressed at T1 were still more depressed over a year) Those were distressed at T1 had a higher percentage of remained distressed at T2 and T3
Boersma et al. (2005)	Mixed	113 (74.3% men, age < 70) mean age = 54.1 ± 10.3	Dutch version HADS: > 7 (Spinhoven., 1997)		14%	10%				
Martin et al. (2003)	Mixed	335 (67% men) Mean age = 67.8	HADS > 7, and HADS > 10	HADS > 7: 15% HADS > 10: 6%		HADS > 7: 13% HADS > 10: 5%	HADS > 7: 10% HADS > 10: 5%			Mean depression remained stable over 6 months
Brink et al. (2002a) (2005)	**Yes**	T1-T2: 114 (67.5% men) Age (M) = 65.4 ± 10.1 Age (W) = 72.2 ± 8.6 T3: 98 (66.3% men) Age (M) = 64.6 ± 9.8 Age (F) = 71.4 ± 8.7	HADS - Possible depressed: > 7 Probable depression: > 10	Possible: 11.4% (if probable: 7.8%)			Possible: 24% (If probable: 9%)	Possible: 13%		Women's mean depression score decreased from T2 to T3 (12 months) (p < 0.02). Men's mean depression score remained stable from T2 to T3

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(continued)

Authors	1st MI or not	Sample	Depression measure & cut-off	In hospital	≤ 1 months post-discharge	1-3 months post-discharge	3-6 months post-discharge	6-12 months post-discharge	>12 months post discharge	Persistence and prevalence of depression
Dickens et al. (2006)	**Yes**	260	HADS - Possible depression > 7 Probable major depressive disorder: (combined) ≥ 17	X			X	X		Mean depression remained stable over 12 months Of those depressed at T1, 45% improved at T3; Of those non-depressed at T1, 21% got worse at T3.
Bennett & Connell (1999b)	**Yes**	43 men men age = 65 ± 8.2 (age < 75)	HADS > 7		24%					
Bjerkeset et al. (2005)	**Yes**	512 (71.8% men) Mean age = 56.2	HADS > 7							Women had MI within 2 years – 26.4% were depressed women had MI between 2-5 years – 13.7% were depressed Men had MI within 2 years – 18.9% were depressed Men had MI 2-5 years – 21.8% were depressed (Ps. Women were older)
Bennett et al. (1999ac)	**Yes**	Age < 75 T1: 43 T2: 37 (mean age = 62, 71% men)	HADS > 10	11.6%		2.7% were depressed (21.6% were anxious)				mean depression significantly decreased over 3 months ($p < 0.05$) (mean anxiety remained stable)
Thornton & Hallas (1999)	**Yes**	30 (age = 64.2 ± 3.2)	HADS Clinical cases: total > 10 Borderline; total: 8 – 10		X				X	Depression was stable over 18 months
Dickens et al. (2004b; 2005)	**Yes**	T1: 314 (63.4% men, 21% had pre-MI depression) age = 57.6 4 ± 11.2 T2: 269	HADS (combined) ≥ 17 SCAND (WHO, 1996)	HADS - 30.3% SCAN - 21%				X		Of 189 non-depressed at T1, 20.6% became depressed at T2 (12 months) Of 80 depressed at T1, 45% no longer reach HADS ≥ 17, and 55% remained depressed
Brummett et al. (1998)	Mixed	T1: 620 T2: 506 (68.2% men) Age = 63.4 ± 11.4 (36-93)	CESD ≥ 16	34.7%	27.1%					Mean depression decreased significantly over 1 month ($p = 0.001$) Of 506 MI patients (at T2), 15.4% were depressed at T1 and T2 27.1% were depressed at T1 only 11.7% were depressed at T2 only 45.8% were never depressed
Havik & Maeland (1990)	Mixed	T1: 383 T2 – T6: 283	SED (Havik, 1982, range 4 – 28), ≥ 15	T1: 9 days: 19% T2: discharge: 13%	26%	22%	19%		3-5 year: 18%	T1 – T6: mean depression decreased at T2, but increased at T3, then depression remained similar to the level of T2 until T6
Parashar et al. (2006)	Mixed (19.7% > 1 MI at T2)	T1: 2096 T2: 1881 (68.4% men, 12.5% had depression history)	PHQ ≥ 10	20.6%	13.1%					Between T1 to T2, 4 groups were categorised – 7.1% had persistent depression (depressed at both times) 6.0% had new depression (only depressed at T2) 13.5% had transient depression (only depressed at T1) 73.5% had no depression at both times

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Authors	1st MI or not	Sample	Depression measure & cut-off	In hospital	≤ 1 months post-discharge	1-3 months post-discharge	3-6 months post-discharge	6-12 months post-discharge	>12 months post discharge	Persistence and prevalence of depression
Shiotani et al. (2002)	Mixed (12.3% > 1 MI)	T1: 111 out of 1042 MI T2: 1042 MI (80.4% men) age = 63 ± 11 (52% < age 65)	Zung's SRDS ≥ 40		X	42%				
Stern et al. (1977)	Mixed	68 (80.9% men, mean age = 53)	Zung's SRDS ≥ 40	22%	17.3%	18%	15.9%	15%		Those depressed at T1 remained depressed at T2 & 70% of these remained depressed at T5 (12 months)
Welin et al. (2000)	**Yes**	275 (83.6% men, age < 65)	Zung's SRDS ≥ 40		36%					
Van Elderen et al. (1999)	Mixed	T1: 278 (age = 54 ± 8.45) T2: 278; T3: 232	Maastrricht Questionnaire, (Appels et al., 1995)		X	X		X		Depression significantly decreased over 12 months ($p < 0.01$)
Jacobsen et al. (1992b)	**Yes**	T1 & T2: 42 (55% men)	MAAC (Zuckerman & Lubin, 1965) (unknown cut-off)	X			X			Depression remained stable over 3-5 months ($p = 0.316$)
Pedersen et al. (2004)	**Yes**	T1: 112 T2: 104 (mean age = 61 ± 9.5)	TSC (Briere & Runtz, 1989) (unknown cut-off)			X		X		Depression remained stable over 9 months ($p = 0.11$)
Denollet & Brutsaert (1998)	Mixed (26.7% 1 MI)	87 (93% men) Age = 55.1 (41-69)	Millon Behavioural Health Inventory (Millon et al., 1982) – Both 'pessimism' and 'despair' subscales > median scores		50.6%					
Strik et al. (2003)	**Yes**	318 men Age = 58 ± 11	SCL-90 (16 items for depression) ≥ 23		47.1%					

BDI: Beck Depression Inventory; CESD: Centre for Epidemiological Studies Depression-Scale; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HRDS: Hamilton Rating scale for depression Scale; ICD-10: the International Classification of Disease, 10th version; MAAC: Multiple Affect Adjective Checklist; MADRS: Montgomery-Asberg Depression Rating Scale; MBHI: Millon Behavioural Health Inventory; MDI: Major Depression Inventor; PHQ-9: Patient Health Questionnaire; PSE: Present State Examination; RDC: Research Diagnostic Criteria; SADI: Symptoms of Anxiety-Depression Index; SADS: Schedule for Affective Disorders and Schizophrenia; SCAND: the Schedule for Clinical Assessment in Neuropsychiatric Disorder; SCID: Structural Clinical Interview for DMS; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd ; SCID-R: Structured clinical interview for DSM-IV; SCL-90: Symptom Check List-90; SRDS: Zung's Self-Rating Depression Scale; TSC: Trauma Symptom Checklist

Overall, 40 studies are presented in Table 2.3 and 39 studies in Table 2.4, respectively. Some studies examined first-time MI patients and some recruited those with previous MI plus first-time MI patients (mixed). Many did not report a power calculation and the number of participants ranged widely from 30 (Thornton & Hallas, 1999) to 2481 (Watkins et al., 2003). The percentage of male participants ranged from 0% to 100% and patients' mean age ranged from 53 to 72 years. Of the longitudinal studies, the follow-up periods varied from before hospital discharge up to 3-5 years post-MI

Prevalence of depressive disorder among MI patients

When the MI patients were still in hospital, the prevalence of depressive disorder ranged from 9.6% (Sorensen et al., 2006) to 73% (Watkins et al., 2003). As Watkins et al. (2003) only recruited patients with either possible depression (measured by the HRSD) or low social support (measured by the ENRICHED Social Support Instrument, 2001), more of their patients might suffer from depression. After excluding this study, the highest percentage of depressive disorder was 46.7% (Carney et al., 2003).

Among the longitudinal studies, 17.2% (van Melle et al., 2007) to 35% (Schleifer et al., 1989) of the MI patients reported depressive disorders during the first three months after hospital discharge. Travella et al. (1994) was the only research group that reported the prevalence of MI patients' depressive disorder after three months of hospital discharge and their results suggested that the prevalence of MI patients' depressive disorders had increased during the 12 months post-MI.

Prevalence of depressive symptoms among MI patients

Several different scales were used to measure MI patients' depressive symptoms among the reviewed studies. However, of the studies that used the same scale, sometimes different cut-off points were applied (e.g., BDI ≥ 10, ≥ 12 or ≥ 14; PHQ ≥ 5 or ≥10; HADS-Depression ≥ 8 or ≥ 11; HADS-Total ≥ 17 or > 19).

During the patients' hospitalisation, those studies that used BDI reported 16.8% (BDI ≥ 10, Fauerbach et al., 2005) to 49% (BDI ≥ 14, Kamm-Stegeiman et al., 2006) of the MI patients had depressive symptoms. Of the studies that used the PHQ-9, the prevalence of depressive symptoms ranged from 20.6% (PHQ ≥ 10, Parashar et al., 2006) to 46% (PHQ ≥ 5, Barry et al., 2007). Two studies used CESD ≥ 16 and reported 17%

(Berkman et al., 1992) and 34.7% (Brummett et al., 1998) of their patients had depressive symptoms. Of the studies that used HADS, the prevalence of the MI patients' depressive symptoms varied from 6% (HADS-Depression ≥ 11, Martin et al., 2003) to 30.3% (HADS ≥ 17, Dickens et al., 2004, 2005)

Among the longitudinal studies that reported the prevalence of depressive symptoms, 2.7% (HADS-Depression ≥ 11, Bennett et al., 1999ac) to 50.6% (Millon Behavioural Health Inventory > median score, Denollet and Brutsaert, 1998) of the MI patients had depressive symptoms during the first three months after hospital discharge. Between 3-6 months post-discharge, 10% (HADS-Depression ≥ 8, Martin et al., 2003) to 39% (BDI ≥ 10, Lauzon et al., 2003) patients had depressive symptoms. Six to twelve months after hospital discharge, 13% (HADS ≥ 8, Brink et al., 2002a, 2005) to 40.4% (BDI ≥ 14, Norris et al., 2007) of the MI patients had depressive symptoms. Havik and Maeland (1990) also reported that 18% of their patients had depressive symptoms after 3-5 years post-MI.

The stability of depression over time

Of the studies that examined the stability of mean depression score, no definite conclusion was found. For example, 13 studies (eight recruited mixed MI patients) reported that mean depression was stable between three months to 3-5 years post-MI. However, five studies (four recruited mixed MI patients) reported that mean depression increased during the first month (Barefoot et al., 2003 & Brummett et al., 1998), the first three months (Bennett et al., 1999ac), the first year (van Elderen et al., 1999) and the first 18 months post-MI (Luutonen et al., 2002).

Although there was no clear pattern of depression stability over time, the findings send out an alarming message. Not only did many of these studies report that MI patients' mean depression score remained stable or increased over time, but also that many depressed hospitalised MI patients remained depressed for 6-12 months (Mayou et al., 2000). For example, both Luzone et al. (2003) and Stern et al. (1977) reported that of the depressed in-hospital MI patients, 70% of them remained depressed after one year. Besides, those who were free of depression during hospitalisation could still become depressed at the later stage (Brummett et al., 1998; Dickens et al., 2004ab, 2005, 2006; Frasure-Smith et al., 1995ab; Parashar et al., 2006; Schleifer et al., 1989).

Why did depression prevalence vary among different studies?

The above review showed that MI patients' depression prevalence rate varied between different studies. A number of reasons may explain this. First, for those studies that measured depressive disorders, some did not follow the standard clinical criteria (e.g. the DSM-III-R), as one criterion (in DSM-III-R) was that either "*depressed, sad mood most of the day*" or "*markedly decreased interest of pleasure in almost all activities, most of the day*" should last for at least 2 weeks. However, in those studies, depression was measured while the MI patients were in hospital (2-5 days after the MI) (Bush et al., 2001; Fauerbach et al., 2005). It was unclear whether these studies measured post-MI depressive disorder, or an episode of pre-MI depression, or transient depressive state.

Secondly, as mentioned earlier, different self-report scales use different cut-off points to screen depressive symptoms and in some studies, different cut-off points were used in one scale. The use of various cut-off points could therefore lead to confusion between clinical depression and depressive symptoms. Also, self-report depression scales are not designed as screening tools for clinical purposes. However, several studies interpreted the prevalence of depressive symptoms as the prevalence of major depressive disorder (Bush et al., 2001; Fauerbach et al., 2005; Romanelli et al., 2002). Some researchers also used self-reported scales (i.e. BDI) to represent severity of major depressive disorder (De Jonge et al., 2006a).

Another issue was that when clinical measures and self-report scales were used together, self-report scales tended to estimate more depressed patients than clinical measures (Barefoot et al., 2003; Bush et al., 2001; Fauerbach et al., 2005; Frasure-Smith et al., 1993, 1995ab; Romanelli et al., 2002). Therefore, if self-report scales are used as clinical screening tools, they may over overestimate depression prevalence.

Furthermore, different self-report scales may measure the different aspects of depression. For example, several studies factor analysed a number of scales (e.g., BDI, HADS) and reported that depression has somatic-affective and cognitive aspects (Arnau et al., 2001;Huffman et al., 2006; Martin et al., 2003; Roberts et al., 2001). This could account for the different prevalence rates of depression. One more issue is the cognitive complexity of self-report measures. Shumway et al. (2004) compared 15 depression scales and found that BDI was more complex than CESD and Zung's SRDS. Therefore, this may influence the respondents' understanding and answers.

MI patients' personal and medical characteristics may also contribute to the different prevalence rates of depression. For example, Barefoot et al. (2003), Brummett et al. (1998), Frasure-Smith et al. (1999), Lane et al. (2000ab, 2001a, 2002a), Lesperance et al. (2002), Mallik et al. (2006), Mayou et al. (2000), Sorensen et al. (2006), Watkins et al. (2002) and Ziegelstein et al. (2005) reported that younger patients, females, unemployed, or those who had lower economic status had worse depression. In addition, several studies recruited patients with previous MI or pre-MI depression and reported that the history of MI and diabetes (Lane et al., 2000ab; Mallik et al., 2006; Schleifer et al., 1989; Watkins et al., 2002) and the history of depression (Strik et al., 2004) significantly correlated with more depression occurrences. Romanelli et al. (2002) and Sorensen et al. (2006) also reported that patients with non-Q-wave MI had higher prevalence of major depression. Therefore, these characteristics should not be ignored.

The time of assessment should be also considered. For example, although several studies measure depression during MI patients' hospitalisation, some measured depression at as late as 28 days or 53 days after admission (Carney et al., 2003; Mallik e al., 2006; Watkins et al., 2003). There may be mood changes between 2-3 days after admission to few weeks after admission.

Finally, cultural influences should be also considered. It could be possible that people from different countries have different tendencies to express or acknowledge their emotions when they are interviewed or answering questions. As most studies tended to recruit MI patients from 1-2 hospitals. The locations of hospitals might link with what types of patients were admitted and treated. Although it is unknown about this issue, researchers should still be cautious about this possibility.

2.1.3.2. Depression and MI patients' physical functioning

Table 2.5 presents seven cross-sectional studies (three studies examined first-time MI patients) and Table 2.6 summarises 31 longitudinal studies (five studies examined first-time MI patients). None of them reported a power calculation and the number of participants ranged from 30 (Thornton and Hallas, 1999) to 2481(Watkins et al., 2002). The percentage of male MI patients varied from 51.5% (Berkman et al., 1992) to 93% (Denollet and Brutsaert, 1998) and the mean age of patients was between 55 (Denollet and Brutsaert, 1998) to 74 (Romanelli et al., 2002). The percentage of patients with previous MI varied from 12.3% (Shiotani et al., 2002) to 37.6% (Thomas et al., 1997). Of the longitudinal studies, the length of follow-up varied from 28 days (Silverstone et al., 1990b) to 10 years (Denollet and Brutsaert, 1998; Welin et al., 2000).

A. Cross-sectional results of depression and post-MI physical functioning

Six studies measured patients' depression between one day to nine days in hospital. Only Thornton and Hallas (1999) measured depression later (4-week post-MI).

Two studies (Cherrington et al., 2004; Parashar et al., 2006) found that in-hospital complications did not significantly correlate with same-time elevated depressive symptoms. Watkin et al. (2002) also reported no significant correlation between in-hospital major depressive disorder and in-hospital baroreflex cardiac control.

However, depressive symptoms significantly correlated with in-hospital vital exhaustion (McGowan et al., 2004) and 4-weeks post-MI blood pressure/heart rate (Thornton & Hallas, 1999). In-hospital depressive disorder was correlated with heart failure (Dickens et al., 2004a, 2005) and CHD severity (Watkins et al., 2003). One interesting finding was that in-hospital depression positively correlated with patients' perceived cumulative burden of co-morbidity at the same time (Watkins et al., 2003), but not with the actual number of co-morbidities (McGowan et al., 2004).

Table 2. 5. Post-MI depression and patients' cross-sectional physical functioning

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to physical morbidity	Control variables for morbidity	Result summary
Dickens et al. (2004a, 2005)	**Yes**	3-6 days in hospital	314 (63.4% men), age = 57.6 ± 11.2	SCAND (WHO, 1996) for pre-MI major depression	In-hospital heart failure (Killip class 2 or 3) – Multivariate analysis: Yes (OR = 2.14, p = 0.03) Other significant predictors: older age (OR = 1.04, p = 0.006), history of angina (OR = 2.67, p = 0.007)	Age, history of angina, diabetes, rheumatological disorder, taking antidepressant medicine,	Multivariate: Yes
Watkins et al. (2002)	Mixed (22% > 1 MI)	6 ± 3 days in hospital	207 (58.4% men)	DIS (& BDI ≥ 10)	In-hospital reduced baroreflex cardiac control - Bivariate analysis: No correlation	X	Bivariate: No
Watkins et al. (2003)	Mixed (17% > 1 MI)	In hospital (average 8 days in hospital, up to 28 days)	2481 (56% men) Age = 61 ± 13 (20 – 97)	1. BDI 2. HRDS (17 items)	1. In-hospital cumulative burden of comorbidity (medical co-morbidity index, Charlson, 1987) - Bivariate analysis: Yes. (major depression were positively correlated with co-morbidity (p < 0.0001) ; minor depression had significant but weaker correlation)	X	Bivariate: Yes
					2. In-hospital severity of CHD (defined by left ventricular ejection fraction, LVEF: < 50% 40 – 50%, < 40%) - Bivariate analysis: Only those with previous MI showed significant positive correlations between minor/major depression with LVEF. Therefore, first-time MI depression was independent from severity of MI		Bivariate: Yes for those with pre-MI depression
Cherrington et al. (2004)	Mixed	24 – 48 hrs hospitalisation	49 (50% men); age = 60.8 ± 13.32	BDI - Mild: 14-19 Moderate: 20-28 Severe: 29-63	In-hospital complications (determined by chart audit) - Univariate analysis: No Multivariate analysis: No (p = 0.39). Significant predictors: total illness perception score (Depression did not mediate illness perceptions and complications)	Age, social economic status, sex, LVEF, thrombolysis, illness perceptions	Univariate: No Multivariate: No
Parashar et al. (2006)	Mixed	Hospitalisation	1873	PHQ ≥ 10	In-hospital complications predicted by depressive symptoms – Bivariate analysis: No correlation	Age, race, sex, medical history (congestive heart failure, diabetes, hypertension, chronic obstructive lung disease, smoking, MI history, MI severity, LVEF (< 40), antidepressant medication at T2. depression history	Bivariate: No
McGowan et al. (2004)	**Yes**	3.6 ± 3.4 days in hospital	305	HADS-D ≥ 8	In-hospital symptoms of vital exhaustion – Bivariate analysis: Yes. Depression correlated with vital exhaustion (r = 0.59, p < 0.01)	Age, sex, number of co-morbidity	Bivariate: Yes
					Number of in-hospital co-morbidity – Bivariate analysis: No correlation (r = 0.07, p = 0.23)	Age, sex	Bivariate: No
Thornton & Hallas (1999)	**Yes**	4-week post-MI	30 (age = 64.2 ± 3.2)	HADS (combined) Clinical case: total ≥ 11 Borderline: total 8 – 10	4-week blood pressure & heart rate – Multivariate analysis: Yes. T1 depression independently accounted for diastolic blood pressure, systolic blood pressure and heart rate;	Global mood (positive and negative), anxiety, hardiness	Multivariate: Yes

BDI: Beck Depression Inventory; CHD: Coronary Heart Disease; DIS: Diagnostic Interview Schedule; HADS: Hospital Anxiety and Depression Scale; HRDS: Hamilton Rating scale for depression Scale; LVEF: Left Ventricular Ejection Fraction; MI: Myocardial Infarction; OR: Odds Ratio; PHQ: Patient Health Questionnaire; SCAND: the Schedule for Clinical Assessment in Neuropsychiatric Disorder;

Table 2. 6. The longitudinal results of depression and MI mortality and morbidity

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to physical morbidity	Control variables for morbidity	Estimated depression related to cardiac/all-cause mortality	Control variables for mortality
Silverstone et al. (1990b)	mixed	T1: 2-days in hospital T2: after 28 days	100	MADRS - Moderate: 8 – 20 Severe: > 20	X	X	T2 mortality - Univariate analysis: Yes. ($p < 0.01$)	No
De Jonge et al. (2006a)	Mixed (14.3% > 1 MI)	T1: in hospital T2: 3 months T3: 6 months T4: 12 months	421 (79.6% men) Age = 61.0 ± 11.4 (15.4% had pre-MI depression)	3 & 12 months: CIDI (T1-T3: BDI)	12-month cardiac related complaints (Health complaints scale, Denollet, 1994) predicted by 3-month major depression – Multivariate analysis: Yes. - somatic complaints (unadjusted β = 2.68), - dyspnoea (OR = 2.27), - fatigue (OR = 2.08) - angina (OR = 2.65) (unknown p value)	Age, sex, cardiac severity, pre-MI depression, MI history, 3-month health status	X	X
De Jonge et al. (2006b)	Mixed (18.8% > 1 MI)	T1: in hospital T2: 3 months T3: 6 months T4: 12 months T5: 2.5 years	468 (55.4% had pre-MI depression)	3 & 12-month: CIDI	2.5 years disability and cardiovascular events predicted by 3-month depression – Multivariate analysis: Yes (only for new post-MI depression vs. non-depressed and those already had pre-MI depression, HR = 1.76)	Age, gender, education, LVEF (< 40%), education, revascularization	X	X
Kaufmann et al. (1999)	Mixed (23% > 1MI)	T1: 3 – 15 days in hospital T2: 6 months T3: 12-months	T1: 331 (65.6% men) age = 65 ± 12.1 (range 28 – 92) (4% with depression history) T2: 316 T3: 285	T1: DIS ≥ 5	X	X	12-month mortality predicted by in-hospital major depression – Univariate analysis: Yes (OR = 2.33, p = 0.015) Multivariate analysis: No Significant predictors: LVEF (OR = 5.07, p = 0.001), CHF (OR =7.23, p = 0.002), previous stroke (OR = 4.68, p = 0.049), diabetes (OR = 2.95, p = 0.018) Ps. In-hospital depression did not predict 6-month mortality	LVEF, previous MI, CHF, CABG, previous stroke, diabetes, age, hypertension, family CAD history, depression, hostility, depression X hostility
Sorensen et al. (2006)	Mixed (15% > 1 MI)	T1: on discharge T2: 1 year	763 (75.7% men) Age < 76	T1: MDI	1-year re-hospitalisation predicted by in-hospital major depression - Univariate analysis: Yes (p = 0.006) Multivariate analysis: No	Unknown	1-year mortality predicted by in-hospital major depression – Univariate analysis: Yes (p = 0.016) Significant correlated variables: age (< 66, p = 0.001), single (p = 0.071), MI type (Q-wave, p = 0.051), LVEF (< 40%, p = 0.028), workload (< 115, p = 0.044) Multivariate analysis: No	Age, single, MI type, ejection fraction, workload
Strik et al. (2004)	**Yes**	T1: 1-month post-MI T2: 3-months T3: 6-months T4: 9-months T5: 12-months T6: 3-years	206 (75.7% men)	T1: SCID-I-R T2, T3, T4: BDI ≥ 10; (HADS ≥ 7; SCL-90 ≥ 22)	3-year health care consumption (hospital re-admission) predicted by 1-month depression- Multivariate analysis: Yes. Depressive disorder (HR = 1.98, p = 0.050) & depressive symptoms (HR = 3.75, p < 0.001) both independently predicted health care consumption	Gender, age, LVEF < 50%, PTCA, Thrombolysis, smoking	3-year major cardiac events (cardiac death and MI) – Univariate analysis: Yes Multivariate analysis: No (neither T1 major depression nor T2 depressive symptoms)	Gender, age, LVEF < 50%, PTCA, Thrombolysis, smoking
Carney et al. (2003)	Mixed (21% > 1 MI)	T1: 28 days in hospital T2: 30 months later	766 (60.4% men) Depressed age = 56.76 ± 12.7 Non-depressed age= 60.89 ± 10.91	DISH (for 7 days), BDI ≥ 10	30-month nonfatal recurrent MI by T1 depression – Univariate analysis: Yes Multivariate analysis: NO (HR = 1.2, p = 0.50)	Age, diabetes, LVEF (< 40%), Killip class (3-4), Creatinine, MI history, coronary bypass history, ACE inhibitor	30-month mortality predicted by T1 depression– Multivariate analysis: Yes (for major and minor depression together, HR = 2.4, p = 0.009) Ps. T1 depression did not predict 8-month mortality	Age, sex, diabetes, smoker, LVEF (< 40%), Killip class (3-4), non-Q-wave MI, Creatinine, prior MI, prior coronary bypass, ACE inhibitor, Aspirin, coronary angioplasty (< 24 hours)

BDI: Beck Depression Inventory; CABG: Coronary Artery Bypass Grafting; CAD: Coronary Artery Disease; CBAHF: Cognitive Behaviour Assessment Hospital Form; CESD: Centre for Epidemiological Studies Depression-Scale; CHF: Chronic Heart Failure; CPK: Creatinine Phosphokinase; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HR: Hazard Ratio; HRDS: Hamilton Rating scale for depression Scale; ICD-10: the International Classification of Disease, 10th version; LVEF: Left Ventricular Ejection Fraction; MI: Myocardial Infarction; MAAC: Multiple Affect Adjective Checklist; MADRS: Montgomery-Asberg Depression Rating Scale; MBHI: Millon Behavioural Health Inventory; MDI: Major Depression Inventor; OR: Odds Ratio; PHQ: Patient Health Questionnaire; PSE: Present State Examination; PTCA: Percutaneous Transluminal Coronary Angioplasty; PVCs: Premature Ventricular Contractions; RDC: Research Diagnostic Criteria; SADI: Symptoms of Anxiety-Depression Index; SADS: Schedule for Affective Disorders and Schizophrenia; SCAND: the Schedule for Clinical Assessment in Neuropsychiatric Disorder; SCID: Structural Clinical Interview for DMS; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd ; SCID-R: Structured clinical interview for DSM-IV; SCL-90: Symptom Check List-90; SRDS: Zung's Self-Rating Depression Scale; TSC: Trauma Symptom Checklist; Type-D personality: negative affectivity and social inhibiting personality

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to physical morbidity	Control variables for morbidity	Estimated depression related to cardiac/all-cause mortality	Control variables for mortality
Romanelli et al. (2002)	Mixed (36% > 1 MI)	T1: 3 – 5 days in hospital T2: 4 months	T1: 153 (55.6% men) Age > 65 Age = 74.5 ± 1.2 T2: 101	T1: SCID, BDI ≥ 10	X	X	4-month mortality predicted by in –hospital major depression – Univariate analysis: Yes. (p = 0.002)	No multivariate analysis was conducted
Bush et al. (2001)	Mixed (30% > 1 MI)	T1: 2-5 days in hospital T2: 4 months post-MI	267	T1: SCID, BDI ≥ 10	X	X	4-month mortality predicted by in-hospital depression – Multivariate analysis: Yes. (for both SCID or BDI). Other significant predictors: age (> 64) and LVEF < 35%, diabetes (unknown other controlled variables)	unknown
Kaptein et al. (2006)	Mixed	T1: in hospital T2: 3 months T3: 6 months T4: 12 months	475 (81% men) mean age = 60.6	T1 – T4: BDI ≥ 10, BDI ≥ 20 T2 & T4: CIDI	12-month new cardiac events predicted by in-hospital depressive symptoms – Multivariate analysis: Yes. Those with significant and increased depressive symptoms had significantly increased risk (HR = 2.46, p = 0.027). Other significant predictor: history of MI (HR = 2.02, p = 0.004)	Gender, living condition, history of MI Killip class ≥ 2, LVEF > 40%, Max CPK-MB	X	X
Frasure-Smith et al. (1993) (1995ab) & Lesperance et al. (1996)	Mixed (37% > 1 MI)	T1: 5-15 days in hospital T2: 6 months T3: 12 months T4: 18 months	T1: 222 (78% men) No age limit Mean age = 60 (22-88) T2 – T3: 170	T1: DIS BDI ≥ 10	12-month recurrent cardiac events – 1. predicted by in-hospital depression: Multivariate analysis: Yes (for T1 depression - major depression, OR = 2.67, p = 0.017 and depressive symptoms, OR = 3.32, p = 0.0005) 2. predicted by 6-month depression - Multivariate analysis: No	Previous MI, ACE inhibitors prescription at discharge, previous depression, anxiety, depressive symptoms	6-month mortality predicted by in-hospital major depression – Univariate analysis: Yes (HR = 5.74, p = 0.0006) Multivariate: Yes. (HR = 4.29, p = 0.013) Other significant predictor: Killip class (HR = 3.52, p = 0.04) 18-month cardiac mortality predicted by in-hospital depression – Univariate analysis: Yes. (T1 major depression, OR = 3.64, p = 0.012 & T1 depressive symptoms, OR = 7.82, p = 0. 0002). Multivariate analysis: No for major depression. Yes for depressive symptoms, OR = 6.64, p = 0.0026. Ps. Depressive symptoms interacted with the frequency of premature ventricular contractions, PVCs ≥ 10 per hour (OR = 6.97, p < 0.00001) 18-month cardiac mortality predicted by 6-month major depression – Multivariate analysis: No	Previous MI, Killip class, LVEF (> 35%), Premature Ventricular Contractions (< 3), Warfarin, Pervious MI, Killip Class, premature ventricular contractions, LVEF (> 35%), ACE inhibitors at discharge X
Frasure-Smith et al. (2000a)	mixed	T1: in hospital T2: 1-year post-MI	848 (68.8% men), 659 (77.7% had 1st MI)	T1: BDI ≥ 10	1-year hospitals visiting – Univariate analysis: Yes (p < 0.0001) Bivariate analysis: Yes	NO	X	X
Frasure-Smith et al. (2000b)	mixed	T1: 7 days in hospital T2: 1-year post-MI	887	T1: BDI ≥ 10	X	X	1-year cardiac mortality predicted by in-hospital depressive symptoms - Univariate analysis: Yes (OR = 3.36, p = 0.0006) Multivariate analysis: Yes (P = 0.0013) Ps. Depression significantly interacted with social support. With low-middle level of support, depression significantly increased cardiac mortality; With the highest quartile of support, there was no depression-related increase in cardiac mortality	Age, Killip class, sex X non-Q-wave MI, sex X LVEF, sex X smoking

BDI: Beck Depression Inventory; CABG: Coronary Artery Bypass Grafting; CAD: Coronary Artery Disease; CBAHF: Cognitive Behaviour Assessment Hospital Form; CESD: Centre for Epidemiological Studies Depression-Scale; CHF: Chronic Heart Failure; CPK: Creatinine Phosphokinase; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HR: Hazard Ratio; HRDS: Hamilton Rating scale for depression Scale; ICD-10: the International Classification of Disease, 10th version; LVEF: Left Ventricular Ejection Fraction; MI: Myocardial Infarction; MAAC: Multiple Affect Adjective Checklist; MADRS: Montgomery-Asberg Depression Rating Scale; MBHI: Millon Behavioural Health Inventory; MDI: Major Depression Inventor; OR: Odds Ratio; PHQ: Patient Health Questionnaire; PSE: Present State Examination; PTCA: Percutaneous Transluminal Coronary Angioplasty; PVCs: Premature Ventricular Contractions; RDC: Research Diagnostic Criteria; SADI: Symptoms of Anxiety-Depression Index; SADS: Schedule for Affective Disorders and Schizophrenia; SCAND: the Schedule for Clinical Assessment in Neuropsychiatric Disorder; SCID: Structural Clinical Interview for DMS; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd ; SCID-R: Structured clinical interview for DSM-IV; SCL-90: Symptom Check List-90; SRDS: Zung's Self-Rating Depression Scale; TSC: Trauma Symptom Checklist; Type-D personality: negative affectivity and social inhibiting personality

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to physical morbidity	Control variables for morbidity	Estimated depression related to cardiac/all-cause mortality	Control variables for mortality
Spijkerman et al. (2006)	Mixed (13.6% > 1 MI)	T1: in hospital T2: 2.5 years	494 Age = 60.5 ± 11.7	T1: BDI ≥ 10	2.5 years cardiac events predicted by in-hospital depressive symptoms – Multivariate analysis: Yes (HR = 1.56, p = 0.04) Other predictors: Anterior MI (p = 0.04), in-hospital complications (p = 0.01), diabetes history (p < 0.01)	Age, gender, living alone, education level, MI site, MI size, heart failure, LVEF < 40%, in-hospital complications, history of CHD, CHD risk factors (hypertension, diabetes, family history, smoking, overweight)	2.5 years cardiac and other mortality predicted by in-hospital depression – Univariate analysis: Yes Multivariate analysis: No (cardiac mortality HR = 2.11, p = 0.13, All-cause mortality: HR = 1.65, p = 0.20)	Age, gender, living alone, education level, MI site, MI size, heart failure, LVEF < 40%, in-hospital complications, history of CHD, CHD risk factors (hypertension, diabetes, family history, smoking, overweight)
Lane et al. (2000ab, 2001a; 2002b; 2005)	Mixed (21% > 1 MI)	T1: 2-15 days in hospital T2: 4-months T3: 12-months T4: 3-years	T1: 288 (74.7% men, 3% with pre-MI depression, 52% had heart failure); age = 62.7 ± 11.5 T2: 263 T3: 257 T4: 250	T1: BDI ≥ 10	X	X	4, 12 & 36-month cardiac mortality predicted by in-hospital depressive symptoms – 4-month mortality - Univariate analysis: No Significant variables: Peel index, Killip class, hospital stay. 12-month mortality – univariate analysis: No Significant variables: age, partnership, education, Peel Index, Killip class, hospital stay. 3-year mortality – univariate analysis: No Multivariate analysis of significant predictors: Killip class, peel index, age, prescription of Warfarin.	No controlled variables No controlled variables Age, education, Killip class, hospital stay, Peel index, depression, anxiety, medication on discharge,
Lauzon et al. (2003)	Mixed (21% > 1 MI)	T1: 2-3 days post-MI T2: 30 days T3: 6 months T4: 1 year	T1: 550 T2: 466 T3: 464 T4: 486	BDI ≥ 10	1-year cardiac complications predicted by in-hospital depressive symptoms – Univariate analysis: Yes Multivariate analysis: Yes. (HR = 1.4)	Age, history of MI, site of MI, diabetes, hypertension, smoking, sex, history of angina	1-year mortality predicted by in-hospital depressive symptoms - Univariate analysis: No (HR = 1.3) Multivariate analysis: No	Age, history of MI, site of MI, diabetes, hypertension, smoking, sex, history of angina
Lesperance et al. (2002); Frasure-Smith et al. (1999); (2003)	Mixed (23.6% > 1 MI)	T1: hospitalisation T2: 1-year post-MI T3: 5-year post-MI	896 (74.1% men) age = 59.4 ± 11.2 (4% with pre-MI depression)	BDI > 11 BDI somatic scale > 6 BDI cognitive scale > 5	X	X	5-year cardiac and all cause mortality – 1. predicted by in-hospital depression - Multivariate analysis: Yes (HR = 3.17, p < 0.001). Both somatic (p = 0.001) & cognitive scale (p = 0.002) did. 2. predicted by 1-year depression – Univariate analysis: Yes Multivariate analysis: No (After controlling in-hospital depression, 1-year depression did not predict T3 mortality) Depression change between T1-T2 only had a significant impact on prognosis in patients with BDI ranged 10 – 18. The greater the decline in depression symptoms, the better the long-term prognosis (p = 0.016). Other groups could only used T1 depression to predict prognosis	Age, sex, education, marital status, smoking, previous MI, diabetes, thrombolysis, Killip class, Q-wave MI, LVEF, revascularisation during admission, β-blocker at discharge, in-hospital depression, 1-year depression
Steeds et al. (2004)	Mixed	T1: hospitalisation T2: 3 months T3: 6 months T4: 32 months	131	T1: BDI-II ≥ 12	X	X	32-monthall-cause mortality predicted by in-hospital depressive symptoms – Univariate analysis: No (OR = 1.8, p = 0.37)	No multivariate analysis was run

BDI: Beck Depression Inventory; CABG: Coronary Artery Bypass Grafting; CAD: Coronary Artery Disease; CBAHF: Cognitive Behaviour Assessment Hospital Form; CESD: Centre for Epidemiological Studies Depression-Scale; CHF: Chronic Heart Failure; CPK: Creatinine Phosphokinase; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HR: Hazard Ratio; HRDS: Hamilton Rating scale for depression Scale; ICD-10: the International Classification of Disease, 10th version; LVEF: Left Ventricular Ejection Fraction; MI: Myocardial Infarction; MAAC: Multiple Affect Adjective Checklist; MADRS: Montgomery-Asberg Depression Rating Scale; MBHI: Millon Behavioural Health Inventory; MDI: Major Depression Inventor; OR: Odds Ratio; PHQ: Patient Health Questionnaire; PSE: Present State Examination; PTCA: Percutaneous Transluminal Coronary Angioplasty; PVCs: Premature Ventricular Contractions; RDC: Research Diagnostic Criteria; SADI: Symptoms of Anxiety-Depression Index; SADS: Schedule for Affective Disorders and Schizophrenia; SCAND: the Schedule for Clinical Assessment in Neuropsychiatric Disorder; SCID: Structural Clinical Interview for DMS; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd ; SCID-R: Structured clinical interview for DSM-IV; SCL-90: Symptom Check List-90; SRDS: Zung's Self-Rating Depression Scale; TSC: Trauma Symptom Checklist; Type-D personality: negative affectivity and social inhibiting personality

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to physical morbidity	Control variables for morbidity	Estimated depression related to cardiac/all-cause mortality	Control variables for mortality
Mayou et al. (2000)	Mixed (22% > 1 MI) (29% angina)	T1: 3 days in hospital T2: 3-months T3: 12-months T4: 18 months	T1: 344 (73% men) age = 63.16 (30-79) T2: 243 T3: 224	Emotional disorder/distressed: HADS-D > 10 or combined HADS >19	12 & 18-month physical complaints predicted by in-hospital and 3-month depression – Univariate analysis: NO (for both).	No multivariate analysis	12 & 18 month mortality predicted by in-hospital and 3-month depression – Univariate analysis: No (for both)	No multivariate analysis
Dickens et al. (2004a)	Mixed (16% > 1 MI)	T1: 3-4 days in-hospital T2: 12 months	T1: 589 (70.3% men) age = 60 ± 11.1, < 80 (23.8% had pre-MI depression) T2: 583	Combined HADS ≥ 17 for pre-MI depressive disorder	12-month cardiac events predicted by pre-MI depression– Univariate analysis: No Significant predictors: female sex (p = 0.0026), angina history (p = 0.0039), Killip class (p = 0.0001), in-hospital cardiac complications (p = 0.0023), calcium channel blockers (p = 0.027), close confidant (p = 0.022)	Demographic data, CHD risk factors, MI severity, discharge medication	12-month cardiac death predicted by pre-MI depression – Bivariate analysis: NO	No multivariate analysis was conducted
Dickens et al. (2007)	Mixed (16% > 1 MI)	T1: 3-4 days in-hospital T2: 12 months T3: 6-8 years, mean = 6.75 years	T1: 588 (70.4% men) age = 60 ± 11.1, < 80 23.8% had pre-MI depression when admitted T3: 587	HADS (combined) ≥ 17 for pre-MI depressive disorder	X	X	6-8 years death predicted by T1 and T2 depression - Univariate analysis: No (for both, p = 0.48 & 0.27) Significant predictors: age (HR = 1.04, p = 0.007), Pre-MI angina (HR = 1.8, p = 0.03), MI history (HR = 1.6, p = 0.004), Killip class (HR = 1.8, p = 0.005), discharge medication (HR = 0.6, p = 0.047)	Age, gender, marital status, education, socioeconomic status, history of co-morbid medical problems (e.g., diabetes), family history of MI, previous MI, angina history, CABG, cholesterol, smoking, Killip class, CPK level, in-hospital complications, thrombolysis, discharge medication
Thornton & Hallas (1999)	**Yes**	T1: 4-week post-MI T2: 18-month post-MI	30 (age = 64.2 ± 3.2)	HADS –depression and anxiety Clinical case: total ≥ 11 Borderline: total 8 – 10	18-month blood pressure & heart rate predicted by 4-week & 18-month post-MI depression – Multivariate analysis: Yes for both. PS. 18-month anxiety also explained 18-month systolic, diastolic blood pressure and heart rate	Global mood, T1/T2 anxiety, hardiness	X	X
Welin et al. (2000)	**Yes**	T1: 1 month post-MI T2: 3-month post-MI T3: 10-year post-MI	275 (83.6% men) Age < 65	SRDS ≥ 40	X	X	10-year coronary mortality predicted by in-hospital depression – Multivariate analysis: Yes. (HR = 3.16, p = 0.0007) Other predictors – female sex (HR = 2.47, p = 0.036), LVEF (HR = 3.93, p = 0.003), lack of support (HR = 2.75, p = 0.009), 3-month ventricular dysrhythmia (HR = 5.45, p = 0.002) 10-year all cause mortality predicted by in-hospital depression – Multivariate analysis: Yes (HR = 1.75, p = 0.041) Other predictors – LVEF (HR = 2.90, p = 0.001), 3-month ventricular dysrhythmia (HR = 2.49, p = 0.03)	Coronary mortality - Age, sex, marital status, education, mental strain, anger-in, type A, health locus of control, irritability, LVEF, 3-month ventricular dysrhythmia, social support, dyspnea, diabetes, social support, social activities, sleep problem All-cause mortality – Age, gender, marital status, education, mental strain, anger-in, type A, health locus of control, irritability, LVEF, 3-month ventricular dysrhythmia, social support, dyspnea, diabetes, social activities
Shiotani et al. (2002)	Mixed (12.3% > 1 MI)	T1: 21 days post-MI T2: 3 months T3: 12 months	T1: 111 out of 1042 MI T2: 1042 MI (80.4% men) (52% < age 65) age = 63 ± 11	SRDS ≥ 40	1-year total cardiac events including mortality predicted by T1 depression – Multivariate analysis: Yes for age > 64 (log rank, p = 0.021) and total participants (OR = 1.46, p = 0.007), Other significant predictors: diabetes mellitus (p = 0.011), age (p = 0.033).	Age, sex, MI severity, coronary risk factors (hypertension, diabetes, smoking)	X	X
Thomas et al. (1997)	Mixed (37.6% > 1 MI)	T1: in hospital T2: 3-6 months post-MI	T1: 424 T2: 348	SRDS ≥ 50	X	X	6-month mortality predicted by in-hospital depression – Univariate analysis: Yes (p = 0.014) Multivariate analysis: No. Significant predictors: state anxiety (OR = 1.06, p = 0.0076), future life events (OR = 1.18, p = 0.0026), past life events (OR = 1.14, p = 0.0022)	LVEF, diabetes, state anxiety, anger out, future life events, past life events

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(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to physical morbidity	Control variables for morbidity	Estimated depression related to cardiac/all-cause mortality	Control variables for mortality
Denollet & Brutsaert (1998)	Mixed (26.7% > 1 MI)	T1: 3-6 weeks post-MI T2: 6-10 years post-MI	87 (93% men) Age = 55.1 (41-69)	Two subscales from MBHI Both 'pessimism' and 'despair' subscales > median scores;	6-7 years cardiac events predicted by T1 depression – Univariate analysis: Yes (OR = 4.3, p = 0.01) Multivariate analysis: No Significant predictors: Type D personality (HR = 4.7, p = 0.001), LVEF (HR = 3.0, p = 0.02)	LVEF ≤ 30%, three-vessel disease, exercise tolerance, history of MI, post-MI smoking, anxiety, anger, Type D personality	6-7 years cardiac death predicted by T1 depression – Univariate analysis: Yes (OR = 7.5, p = 0.01) Multivariate analysis: No Significant predictors: LVEF (p = 0.006), type D personality (p = 0.003)	LVEF ≤ 30%, three-vessel disease, exercise tolerance, history of MI, post-MI smoking, anxiety, anger, Type D personality
Parashar et al. (2006)	Mixed	T1: hospitalisation T2: 1 month post discharge T3: 6 months post discharge	T1: 1873	PHQ ≥ 10	6-month re-hospitalisation, angina frequency and physical limitation predicted by depression occurrence – Bivariate analysis: Yes No matter depression is transient (in-hospital), new (1-month) or persistent (both time), depressive symptoms significantly correlated with more re-hospitalisation (HR all p < 0.05), more angina (OR all p < 0.01), more physical limitation (OR all p < 0.05 Multivariate analysis: Yes	Age, race, sex, medical history (congestive heart failure, diabetes, hypertension, chronic obstructive lung disease, smoking, MI history, MI severity, LVEF (< 40), antidepressant medication at T2. depression history	X	Multivariate analysis was not run due to small mortality
Berkman et al. (1992)	Mixed (35% > 1 MI)	T1: before discharge T2: 6 months post-MI	194 (51.5% men), age > 64	CESD ≥ 16	X	X	6-month mortality predicted by in-hospital depression – Univariate analysis: No Significant predictor: emotional support	Gender, age Killip class, LVEF, reinfarction, comorbidity, functional disability, MI history, ventricular tachycardia
Carinci et al. (1997)	Mixed (12.7% > 1 MI)	T1: in-hospital T2: 6 months	T1: 2449 (87.6% men)	CBAHF (Bettinardi, 1995)	X	X	6-month mortality predicted by in-hospital depression – Univariate analysis: No (HR = 1.7, p = 0.08) Multivariate analysis: No Significant predictors: Exercise test ineligibility (HR = 4.5, p < 0.01), early ventricular failure (HR = 2.4, p < 0.01), late ventricular failure (HR = 2.9, p < 0.01), extroversion (HR = 0.6, p = 0.04)	Exercise test positive, electrical instability, left ventricular dysfunction, previous MI, age (> 70), hypertension, sex
Pedersen et al. (2004)	**Yes**	T1: 4-6 weeks post-MI T2: 9 months	T1: 112 T2: 104 (age = 61 ± 9.5)	TSC-depression (no cut-off)	9-month recurrent cardiac events predicted by 4-week depression - Univariate analysis: No Multivariate analysis: No (OR = 1.10, p = 0.21) Significant predictor: T1 total low social support (OR = 0.9, p < 0.01)	Intrusion, avoidance, arousal, PTSD< depression, somatic complaints, total support, support satisfaction	X	X
Strik et al. (2003)	**Yes**	T1: 1-month post-MI T2: 3.4 years post-MI, range 1-70 months	318 men age 58 ± 11	SCL-90 (16 items) ≥ 23	3.4-year health care consumption predicted by 1-month depression – Univariate analysis: No (OR = 1.55, p = 0.07) Multivariate analysis: No (p = 0.645) Significant predictor was anxiety (OR = 2.00, p = 0.005)	Age (> 58), LVEF (≤ 50%), use of antidepressants, anxiety, hostility	3.4-year major cardiac events predicted by 1-month depression - Univariate analysis: Yes (HR = 2.32, p = 0.04) Multivariate analysis: No (p = 0.4) Significant predictors: anxiety (HR = 2.79, p = 0.03), age (HR = 2.44, p = 0.047), LVEF (HR = 2.29, p = 0.047)	Age (> 58), LVEF (≤ 50%), use of antidepressants, anxiety, hostility

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B. Longitudinal mortality and morbidity

Eighteen studies examined the relationship between depression and non-fatal cardiac events and other outcomes including re-hospitalisation (health care consumptions), physical limitations and angina frequency, etc. Ten (four studies measured depressive disorders) reported that depression within 1-month post-MI was an independent predictor. Four studies found that in-hospital depressive symptoms did not significantly correlate with worse cardiac complaints or more health care consumption. Three studies (two studies measured depressive disorders) showed that although depression positively correlated with worse physical complaints, after controlling for confounding variables (e.g., age or MI severity), depression was no longer an independent predictor.

Of those studies that examined the relationship between depression and (cardiac) mortality, nine found that although depression correlated with higher mortality, its predictive power reduced after controlling for other variables. Six studies found that depression was an independent predictor after controlling other variables, but eight studies found that MI patients with high depressive symptoms were not at a greater risk of cardiac or all-cause mortality. Two studies (Romanelli et al., 2002; Silverstone et al., 1990b) only used univariate analysis and reported a positive correlation between depression and low survival rate at around 1 and 4 months post-MI.

The majority of the studies found that depression had a negative impact on MI patients' physical recovery and/or mortality. However, the inconsistent findings probably indicated the complication of depression on MI progress mechanism. For example, unlike most studies that only used baseline depression to predict follow-up outcomes, Kaptein et al. (2006) examined the development of trend of depression at four time-points during the first year. They reported that not all depressed MI patients suffered from more recurrent cardiac events than non-depressed patients, but only those with increased depression scores over time. Carney et al. (2004) also reported a similar finding that those whose depression got worse over time and those who did not respond to depression treatment had much higher mortality risk.

Other possibilities that may account for these inconsistencies include different measuring times, different measurement scales, participants' characteristics, different confounding variables, the way the data was analysed and the length of follow-up. For example, findings of Carney et al. (2003) and Kaufmann et al. (1999) suggested that in-hospital (major) depression might not affect some patients' survival until at least eight

months after hospital discharge, as both studies showed that in-hospital depression did not predict six or eight months post-MI mortality but it predicted 12 and 18-month post-MI mortality. However, the findings of Frasure-Smith et al. (1993, 1995ab; Lesperance et al, 1996) suggested that probably the time-points between depression measurement and mortality should be also considered. They reported that in-hospital depressive symptoms predicted both 6-month and 18-month post-MI mortality, but 6-month post-MI depressive symptoms did not predict 18-month mortality.

According to Clark et al. (2003), when analysing survival rate, the log-rank method probably is the most popular non-parametric test and it is quite robust. However, its lack of effect size limits the possibility to compare studies with different designs and sample sizes, as was shown in these studies. Besides, the power of a survival analysis not only relates to the number of participants, but also the number of death events. If the follow-up length is not long enough to capture enough death events, it cannot ensure sufficient statistical power. Sorensen et al. (2005) also mentioned that if one accepts that 30% of the MI patients have elevated depressive symptoms at discharge and if 1-year mortality rates of depressed vs. non-depressed are 10% and 5%, respectively, it will need at least 950 patients to show a significantly statistical difference in mortality ($\alpha = 0.05$ & $\beta = 0.20$). If major depression disorder is used, then more participants should be recruited, as the prevalence of major depression is normally lower than that of depressive symptoms.

Another issue that relates to follow-up length and sample size in survival analyses is the confounding variables. Simulation work has suggested that at least 10 death events need to be observed for each considered covariate variable, and anything less will lead to problems, such as biased regression coefficients (Bradburn et al., 2003; Peduzzi et al., 1995). Given the fact that most of the reviewed studies did not recruit more than 500 participants and they used different criteria to select predictors, it was possible some negative results may be underestimated or biased. In addition, several studies showed that the predictive power of depression decreased after other variables (e.g. MI severity indices like LVEF, Killip class, age, sex, MI history) were considered and this suggests that depression may be partly dependent on other factors.

The potential mechanisms that link depression and impaired cardiovascular prognosis are still unclear, but several researchers have tried to explain them. As van Melle et al. (2004) summarised, depressed MI patients' unhealthy behaviour could be one of the reasons. Post-MI depression is also associated with an increase in sympathetic nervous

system activity (Carney et al., 2001; Romanelli et al., 2002; Watkins & Grossman, 1999), which could increase the risk for fatal arrhythmic events (Carney et al., 1993). Besides, depressed ischemic heart disease patients had increased platelet activation, which may point to an increased tendency to form thrombi (Laghrissi-Thode, et al., 1997).

2.1.3.3. Depression and MI patients' psychosocial wellbeing

Twenty studies examined the relationships between depression and post-MI psychosocial progress, including quality of life, health behaviour, moods, cardiac rehabilitation attendance, return to work, and treatment adherence (Table 2.7). Except for White & Groh (2007), all the reviewed studies measured depression during patients' hospitalisation. Seventeen studies (excluding Kamm-Stegelman et al., 2006; Watkins et al., 2002; White & Groh, 2007) were longitudinal and the length of follow-up ranged from three months (Bennett et al., 1999abc) to five years (Bjerkeset et al., 2005; Drory et al, 1999, 2002).

The mean age of MI patients ranged between 52 (Drory et al., 1999; 2002; Kamm-Stegelman et al., 2006) to 74 (Romanelli et al., 2002). The percentage of males ranged from zero (White & Groh, 2007) to 100% (Drory et al., 1999, 2002). Ten studies examined mixed MI patients and the percentage of patients with previous MI varied from 14.3% (De Jonge et al., 2006a) to 36% (Romanelli et al., 2002).

Most of these studies reported that baseline depression (mainly in-hospital depression) independently influenced patients' psychological wellbeing at the later stage, although some did not support this. For example, of the twelve studies that measured post-MI quality of life as the outcome, three found that in-hospital depression could not predict 5-month (Brink et al., 2002a, 2005) and 12-month (Beck et al., 2001; Dickens et al., 2006) quality of life. However, as only two studies (De Jonge et al., 2006a; Dickens et al., 2006) took into account the MI patients' baseline quality of life, the study designs may contribute to the difference between studies.

Table 2. 7. Findings of depression and MI patients' psychosocial wellbeing

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to psychological wellbeing	Control variables for psychological wellbeing	Result summary
Watkins et al. (2002)	Mixed (22% > 1 MI)	6 ± 3 days in hospital	207 (58.4% men)	Depressive disorder: DIS interview (BDI ≥ 10)	In-hospital anxiety - Bivariate analysis: Depressive disorder correlated with higher anxiety level ($p < 0.0001$)	No multivariate analysis was conducted	Bivariate: Yes
De Jonge et al. (2006a)	Mixed (14.3% > 1 MI)	T1: in hospital T2: 3 months T3: 6 months T4: 12 months	421 (79.6% men) Age = 61.0 ± 11.4 (15.4% had pre-MI depression)	T1-T3: BDI (0-9, 10-19, 20-29, > 29 T2 & T4: CIDI (Wittchen, 1994)	12-month health related QoL (SF-36, Ware et al., 1994) predicted by 3-month major depression – Multivariate analysis: Yes (for major depression) Major depression predicted physical functioning, social functioning, role limitations (physical and emotional), general health (unknown p value) The severity of depression, but not the duration of depression, strongly contributed to quality of life	Age, sex, history of depression, cardiac disability, cardiac complaints, 3-month health status	Multivariate: Yes
Fauerbach et al. (2005)	Mixed (24% > 1 MI)	T1: 2-5 days post-MI T2: 4 months	196 (57.1% men) (52.5% age > 65)	T1: BDI & SCID	4-month QoL (SF-36, Ware et al., 1994) – Multivariate analysis - General health: Yes for major depression (adjusted $\beta = 64.4$, $p < 0.01$) Multivariate analysis - Overall mental health: Yes for major depression (adjusted $\beta = 76.1$, $p < 0.01$)	Pre-MI quality of life, in-hospital anxiety, age, sex, race	Multivariate: Yes
Romanelli et al. (2002)	Mixed (36% > 1 MI)	T1: 3 – 5 days hospitalisation T2: 4 months	T1: 153 (55.6% men) Age limit > 65 Mean age = 74.5 ± 1.2 T2: 101	1 BDI ≥ 10 2. SCID	4-month rehabilitation adherence (Medical outcomes study specific adherence scale, MOSSAS, DiMatteo, 1992) – Univariate analysis: Yes. Older people with depression had significantly lower adherence than non-depressed (6 out of 10 dimensions, $p < 0.01$ to $p < 005$) Ps. Baseline health behaviour was not controlled	NO	Univariate: Yes
Kamm-Stegelman et al. (2006)	Mixed	At discharge	59 women age = 52.8 ± 8.48	BDI-II (Beck, 1988) - Mild: 14-19 Moderate: 20-28 Severe: ≥ 29	In-hospital mental health (SF-36, Ware et al., 1994) - Bivariate analysis: Yes. Depression was negatively correlated with mental health (McDowell, 1996, $r = -0.53$, $p < 0.01$) & satisfaction with life (Diener, 1985, $r = -0.43$, $p < 0.01$)	NO	Bivariate: No
Beck et al. (2001)	Mixed	T1: in hospital T2: 6 months T3: 12 months	T1: 587 T2: 480 T3: 491	BDI ≥ 10	6 month QoL predicted by in-hospital depressive symptoms (SF-36, Ware, 1992 & EuroQol, Hurts, 1994) - 1. Physical QoL - Multivariate analysis: Yes ($\beta = -1.6$) Other significant predictors: in-hospital QoL, age, previous bypass, Killip class, in-hospital shock 2. Mental QoL –Multivariate analysis: Yes ($\beta = -3.7$) Other significant predictors: in-hospital QoL, creatine kinase 3. Overall QoL – Multivariate analysis: Yes ($\beta = -5.4$) Other significant predictors: in-hospital QoL, age, employment 12-month QoL predicted by in-hospital depressive symptoms – 1. Physical QoL – Multivariate analysis: No Other significant predictors: in-hospital QoL, age, male sex, previous bypass 2. Mental QoL – Multivariate analysis: Yes ($\beta = -3.0$) Other significant predictors; in-hospital QoL 3. Overall QoL – Multivariate analysis: No Other significant predictors: in-hospital QoL, age, previous bypass, diabetes, acute ventriculoseptal defect	Age, sex, education, marital status, employment, previous MI, angina, angioplasty, bypass surgery, diabetes, hypertension, smoking, MI site, Q-wave, Killip class, peak creatine kinase, in-hospital complications (reinfarction, shock, congestive heart failure, recurrent ischemia, any arrhythmia, acute ventriculoseptal defect, thrombolysis, depression, in-hospital QoL	6 months: Multivariate: Yes for all 12-month: Multivariate: Yes for mental QoL
Fogel et al. (2004)	Mixed (30.7% > 1 MI)	T1: 2 – 5 days in hospital T2: 4-months	T1: 285 (57.2% men) T2: 205 (Age = 64.03 ± 11.7)	T1 & T2: BDI ≥ 10	4-month rehabilitation adherence after MI (Medical Outcomes Study Specific Adherence Scale, MOSSAS, DeMatteo, 1992) – Multivariate analysis: Yes. 4-month depressive symptoms contributed to 4-month rehabilitation adherence ($\beta = -0.251$, $p < 0.001$). So did 4-month physical QoL ($\beta = 0.216$, $p < 0.001$) Prospective: Yes. In-hospital depressive symptoms predicted 4-month adherence ($\beta = -0.173$, $p < 0.01$). So did in-hospital physical QoL ($\beta = 0.150$, $p < 0.05$)	Age, cigarette use, depression, QoL (in-hospital and 4-month physical and mental QoL)	Multivariate: Yes

BDI: Beck Depression Inventory; CABG: Coronary Artery Bypass Grafting; CAD: Coronary Artery Disease; CBAHF: Cognitive Behaviour Assessment Hospital Form; CESD: Centre for Epidemiological Studies Depression-Scale; CHF: Chronic Heart Failure; CPK: Creatinine Phosphokinase; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HR: Hazard Ratio; HRDS: Hamilton Rating scale for depression Scale; ICD-10: the International Classification of Disease, 10th version; LVEF: Left Ventricular Ejection Fraction; MI: Myocardial Infarction; MAAC: Multiple Affect Adjective Checklist; MADRS: Montgomery-Asberg Depression Rating Scale; MBHI: Millon Behavioural Health Inventory; MDI: Major Depression Inventor; OR: Odds Ratio; PHQ: Patient Health Questionnaire; PSE: Present State Examination; PTCA: Percutaneous Transluminal Coronary Angioplasty; QoL: Quality of Life; RDC: Research Diagnostic Criteria; SADI: Symptoms of Anxiety-Depression Index; SADS: Schedule for Affective Disorders and Schizophrenia; SCAND: the Schedule for Clinical Assessment in Neuropsychiatric Disorder; SCID: Structural Clinical Interview for DMS; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd ; SCID-R: Structured clinical interview for DSM-IV; SCL-90: Symptom Check List-90; SF-36: Short Form 36; SRDS: Zung's Self-Rating Depression Scale; TSC: Trauma Symptom Checklist
Type-D personality: negative affectivity and social inhibiting personality

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to psychological wellbeing	Control variables for psychological wellbeing	Result summary
Lane et al. (2000ab, 2001ab; 2002b; 2005)	Mixed (21% > 1 MI)	T1: 2-15 days in hospital T2: 4-months T3: 12-months	T1: 288 (74.7% men, 3% with depression history, 52% with cardiac failure); age = 62.7 ± 11.5 T2: 263 T3: 257	T1: BDI ≥ 10	4 & 12-month QoL (Dartmouth COOP charts, Nelson, 1990) predicted by in-hospital depression– 4-month QoL: multivariate analysis - Yes. (β = 0.20, p = 0.0001). Other significant contributors: Peel index (β = 0.24, p = 0.001), partnership (β = 0.22, p = 0.002), state anxiety (β = 0.18, p = 0.02)	Age, sex, partnership, living condition, employment, exercise, depression, Peel index, depression, state/trait anxiety, hospital stay	Multivariate: Yes
					12-month QoL: Multivariate analysis: Yes (β = 0.21, p = 0.001). Other significant predictors: living condition (β = 3.79, p = 0.001), Peel Index (β = 0.34, p = 0.001), state anxiety (β = 0.10, p = 0.008). Ps. Baseline QoL was not controlled	Gender, partnership, living condition, employment, exercise frequency, depression, state/trait anxiety, Peel Index, Killip class, hospital stay,	Multivariate: Yes
					6-8 weeks post-MI rehabilitation attendance predicted by in-hospital depression – Univariate analysis: No. Significant predictors: deprivation score (OR = 1.2, p < 0.001), employment status (OE = 2.33, p = 0.005), frequency of previous exercise behaviour (OR = 0.88, p = 0;001), Thrombolysis (OR = 1.8, p = 005)	Sex, partnership, living condition, employment, deprivation score, frequency of previous exercise, depression, trait anxiety, Peel Index, previous MI, angina pectoris, thrombolysis	Univariate: Yes Multivariate: No
Drory et al. (1999) (2002)	**Yes**	T1: before discharge T2: 6 months T3: 5-year	T1: 290 men T2: 209 men (age = 52 ± 8)	BDI	6-month psychosocial adjustment to illness (PAIS-SR, Dorogatis, 1986, 7 domains) - Multivariate analysis: Yes. In-hospital depression predicted 6 domains of worse psychosocial adjustment 6-month psychological distress (Mental Health Inventory, MHI, Veit, 1983) - Multivariate analysis: Yes. In-hospital depression predicted 6-month psychological distress, but not wellbeing	Age, education, origin, Killip class, pre-MI heart disease, concomitant medical problems, pre-MI perceived health, social support, sense of coherence	Multivariate: Yes
					5-year psychological distress - No. In-hospital depression did not predict 5-year wellbeing and psychological distress	Age, education, origin, Killip class, pre-MI heart disease, concomitant medical problems, pre-MI perceived health, social support, sense of coherence, 6-month wellbeing and 6-month distress	Multivariate: No
White & Groh (2007)	**Yes**	T1: Mean = 11 months (1 week to 35 months post-MI)	27 women Age = 60.7 ± 15.38	BDI 5-9: normal BDI 10-18: mild to moderate BDI 19-29: moderate to severe BDI > 29: severe depression	QoL (SF-36, Ware et al., 1994) predicted by same time depressive symptoms – Bivariate analysis: Depressed women had lower mental component functioning (r = -0.721, p = 0.005), but not physical quality of life at the same time (r = -0.191, p = 0.36).	No	Bivariate: Yes
Dickens et al. (2004b; 2005)	**Yes**	T1: in hospital T2: 1 year	T1: 314 (63.4% men) age = 57.6 ± 11.2 (age < 80) T2: 269	T1: SCAND HADS ≥ 17	In-hospital HADS depression – Multivariate analysis: In-hospital depression was predicted by young age (OR = 0.95, p = 0.002), female sex (OR = 2.3, p = 0.018), psychiatric history (OR = 5.7, p < 0.0005), social isolation (PR = 4.7, p < 0.0005), having a marked non-health difficulty (OR = 2.4, p = 0.002), absence of a close confidant (OR = 9.2, p = 0.02)	Age, sex, ethnicity, educational status, past psychiatric history, social isolation, absence of a close confident, pre-MI angina, number of non-cardiac problems, whether separated from parents during childhood, Killip class, CPK levels	
					1-year depression predicted by pre-MI depression – No. For those non-depressed at T1 but become depressed at 1-year post-MI, ongoing health difficulty (angina) was the only significant predictor. Yes. For those depressed at T1 and T2, age (negative correlation), pre-MI depression, ongoing health problems, social isolation and angina were significant predictors	Age, sex, ethnicity, educational status, past psychiatric history, social isolation, absence of a close confident, pre-MI angina, number of non-cardiac problems, whether separated from parents during childhood, Killip class, CPK levels, cardiac events during follow-up period, 11-month angina frequency	Multivariate: No & Yes
Mayou et al. (2000)	Mixed (22% > 1 MI) (29% angina)	T1: 3 days in hospital T2: 3-months T3: 12-months T4: 18 months	T1: 344 (73% men) age = 63.16 (30-79) T2: 243 T3: 224	Emotional disorder/distressed: HADS-D > 10 or combined HADS >19	12-month QoL (SF-36, Ware, 1992) – Univariate analysis: Yes. (In-hospital & 3-month emotional distress had more physical complaints and everyday activities and, more health service usage and lifestyle changes).	NO	Univariate: Yes (but no clear comparison results and p value)
French et al. (2005a)	Mixed (18.6% > 1 MI)	T1: 1-day in hospital T2: 6 months	T1: 194 (158 1st MI) T2: 154	HADS	6-month rehabilitation attendance predicted by in-hospital depression- Univariate analysis: No Significant variables: old age, smokers, unemployed (less likely to attend)	NO	Rehabilitation attendance: No
					6-month Quality of Life for MI (QLMI, Lim, 1993) – Bivariate: Yes (depression negatively correlated with emotional, physical and social QoL, p < 0.05) Multivariate analysis: Yes (for emotional, physical and social QoL). Other significant predictors: illness consequences (for physical QoL, emotional QoL and social QoL), anxiety (for emotional QoL)	Step 1: Anxiety, depression, confidence in recovery, Step 2: illness consequences,	QoL: Multivariate: Yes

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Type-D personality: negative affectivity and social inhibiting personality

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated depression related to psychological wellbeing	Control variables for psychological wellbeing	Result summary
Brink et al. (2002a) (2005)	**Yes**	T1: 4-6 days in hospital T2: 5 months T3: 1 year	T1-T2: 114 (67.5% men) Age (M) = 65.4 ± 10.1 Age (W) = 72.2 ± 8.6	HADS-D ≥ 8	5-month QoL (SF-36, Ware et al., 1994) predicted by in-hospital depression - No prediction	unknown	Multivariate: No
					5-month QoL – multivariate analysis: No Physical QoL - Multivariate analysis: No. (Only 5-month health complaints predicted physical QoL). Mental QoL - Multivariate analysis: Yes for 5-month depression (and 5-month health complaints did)	5-month anxiety, sense of coherence, coping (5 types), and health complaints 5-month anxiety, sense of coherence, coping (3 types) and health complaints	Multivariate: No
			T3: 98 (66.3% men) Age (M) = 64.6 ± 9.8 Age (F) = 71.4 ± 8.7		1-year QoL (SF-36, Ware et al., 1994) - Females: in-hospital & 5-month depression and age predicted 1-year physical QoL.. 5-month depression and 1-year fatigue predicted 1-year mental QoL. Males: 5-month depression and 1-year fatigue predicted 1-year physical quality of life. Age, in-hospital depression, 5-month depression and 1-year fatigue predicted 1-year mental QoL.	Age, 1-year fatigue	Multivariate: Yes
Bjerkeset et al. (2005)	**Yes**	T1: in hospital T2: 2- 5 years	512 (71.8% men, women were older) Mean age = 56.2 (35-79)	HADS ≥ 8	2-5 years depression predicted by in-hospital depression and anxiety - Multivariate analysis: Yes for both men and women (both p = 0.001)	MI history, age, education (> 9), employ status, marriage status, excessive alcohol intake, BMI, exercise frequency per week	Multivariate: Yes
					2.5 years anxiety predicted by in-hospital depression and anxiety – Multivariate analysis: Yes for both men and women (both p = 0.001)		
					Within 2 years post-MI: women had a high risk of both depression and anxiety. After 2-5 years post-MI: men increased risk of depression, but not anxiety. Interaction effect of gender and time was significant for depression but marginally for anxiety		
Dickens et al. (2006)	**Yes**	T1: in-hospital T2: 6 months T3: 12 months	260 (Age < 80)	HADS -D ≥ 8	1-year QoL (SF-36 physical component, Ware et al., 1994) – Predicted by pre-MI depression: No (multivariate analysis) Predicted by 6-month depression: Yes (p = 0.004) (and anxiety, p = 0.037) for multivariate analysis, and it was mediated by 'fatigue' feeling.	Block 1: Age, sex, marital status, education (< 12), socio economic status, baseline SF-36 physical component score, Block 2: current rheumatic, respiratory, gastrointestinal or other diseases, ongoing Block 3: ongoing cardiac risk factors (diabetes, serum cholesterol, hypertension, previous cardiac disease, smoking history), MI severity (Killip class, CPK), MI site, thrombolysis or surgical intervention at admission, medication on discharge, cardiac events during the subsequent 12 months Block 4: in-hospital (or 6-month) HADS anxiety and depression	Multivariate: No & Yes
Bennett et al. (1999abc)	**Yes**	T1: in hospital T2: 3 months	T1: 43 T2: 37	HADS ≥ 11	3-month health behaviours - exercise, dietary, smoking & alcohol intake - Bivariate analysis: Depression (and anxiety) did not correlate with these three behaviours	No multivariate analysis for depression (and anxiety)	Bivariate: No
Bogg et al. (2000)	**Yes**	T1: 3-4 days in-hospital T2: 1 month T3: 3 months T4: 6 months	220 (77% men) Men age = 60 ± 9.9 Women age = 61 ± 8.8 Age < 75	HADS	6-month QoL (measured by Quality of Life after MI questionnaire, Lim et al., 1993) – Males: multivariate analysis – Yes. 6-month physical quality of life was predicted by 1-month depression Females: multivariate analysis – Yes. 6-month social quality of life was predicted by in-hospital & 1-month depression. 6-month physical quality of life was predicted by in-hospital depression	Social QoL: Males – emotion focused coping; Females – task oriented coping, in-hospital & 1-month depression Physical QoL: Males – 1-month depression; Females – in-hospital depression, 1-month negative mood Emotional QoL: Males – in-hospital & 1-month anxiety, 1-month negative mood, emotion focused coping, avoidance coping; Females – emotion focused coping, 1-month negative mood	
Gilutz et al. (1991)	**Yes**	T1: in hospital T2: 10-15 days T3: 6 months	186 (87 Israeli & 98 Swedish)	Holland Sgroi Anxiety Depression Scale & the Hackett-Cassum Denial Scale (Froese, 1974)	6-month return to work and subjective functioning – Bivariate analysis: Yes. (In-hospital depression negatively correlated with both groups 6-month subjective functioning)	No	Bivariate: Yes
Soejima et al. (1999)	Yes	T1: 24.8 days in hospital T2: 8 months later	111 married men age = 54.3 ± 7.1	Japanese version of the Cornell Medical Index for depression (Brodman, 1949)	8-month return to work predicted by T1 depressive symptoms – Multivariate analysis: Yes. (OR = 4.79, p = 0.031) Other significant predictors: high extraversion also predicted return to work (p = 0.01)	Age, education, occupation, extraversion, health locus of control	Multivariate: Yes

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Type-D personality: negative affectivity and social inhibiting personality

2.2. State Anxiety

2.2.1. What is state anxiety?

The concepts of anxiety were first introduced and measured by Cattell and Scheier (1963). They applied multivariate techniques to define and measure anxiety. In their series of factor analytic studies, the relatively independent state and trait anxiety factors consistently emerged (Cattell, 1966).

State anxiety refers to the level of anxiety responses reported by an individual at a particular time point. These responses could be physical (e.g., rapid heartbeat), cognitive (e.g., people are looking), and emotional (e.g., fear). Spielberger et al. (1994) defined state anxiety as a "*...temporal cross section in the emotional stream of life of a person, consisting of subjective feelings of tension, apprehension, nervousness, and worry, and activation of the autonomic nervous system.*" (pp. 295 – 296) Trait anxiety is regarded as the strong tendency when an individual becomes anxious whenever facing stressful situations.

Like depression, anxiety can also become a "disorder" if it hinders a person's daily functioning. In the DSM diagnostic system, anxiety disorder can be categorised into eleven different groups, including 'acute stress disorder', 'panic attack', 'anxiety disorder due to medical condition' and 'post traumatic stress disorder (PTSD)', etc. Each of these disorders has its own diagnostic criteria. Taking MI as the example, as it happens suddenly and is a life-threatening experience, it may link with 'panic disorder', 'anxiety disorder due to medical condition' or 'posttraumatic stress disorder' (Doerfler et al., 1994; Fleet et al., 1998, 2000; Jeejeebhoy, et al., 2000; O'Reilly, et al., 2004; Owen et al., 2001; Shemesh et al., 2004). Therefore, it is important to differentiate anxiety disorders from the general population's anxiety responses. Table 2.8 summarises the diagnosis of these three anxiety disorders mentioned above.

Table 2. 8. The DSM diagnostic criteria for three types of anxiety disorders

Anxiety disorder due to general medical condition(s)	Posttraumatic stress disorder	Panic attacks
The diagnosis of this Anxiety Disorder is made when there is evidence that persistent anxiety symptoms, including Panic Attacks, obsessions, or compulsions have arisen out of a general medical condition: A. Prominent anxiety, Panic Attacks, or obsessions or compulsions predominate in the clinical picture. B. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of a general medical condition. C. The disturbance is not better accounted for by another mental disorder (e.g., Adjustment Disorder With Anxiety in which the stressor is a serious general medical condition). D. The disturbance does not occur exclusively during the course of a Delirium. E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. Ps. specify if with generalized anxiety, with panic attacks, with obsessive-compulsive symptoms.	When an individual who has been exposed to a traumatic event develops anxiety symptoms, re-experiencing of the event, and avoidance of stimuli related to the event lasting more than four weeks, they may be suffering from this Anxiety Disorder. A. The person has been exposed to a traumatic event in which both of the following were present: (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others (2) the person's response involved intense fear, helplessness, or horror. B. The traumatic event is persistently re-experienced in one (or more) of the following ways: (1) recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. (2) recurrent distressing dreams of the event. (3) acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dis-associative flashback episodes, including those that occur on awakening or when intoxicated). (4) intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event (5) physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following: (1) efforts to avoid thoughts, feelings, or conversations associated with the trauma (2) efforts to avoid activities, places, or people that arouse recollections of the trauma (3) inability to recall an important aspect of the trauma (4) markedly diminished interest or participation in significant activities (5) feeling of detachment or estrangement from others (6) restricted range of affect (e.g., unable to have loving feelings) (7) sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span) D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following: (1) difficulty falling or staying asleep (2) irritability or outbursts of anger (3) difficulty concentrating (4) hypervigilance (5) exaggerated startle response E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month. F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. Ps. specify for acute, chronic or with delayed onset	Intense anxiety of sudden onset and brief duration characterizes a Panic Attack: A discrete period of intense fear or discomfort, in which four (or more) of the following symptoms developed abruptly and reached a peak within 10 minutes: (1) palpitations, pounding heart, or accelerated heart rate (2) sweating (3) trembling or shaking (4) sensations of shortness of breath or smothering (5) feeling of choking (6) chest pain or discomfort (7) nausea or abdominal distress (8) feeling dizzy, unsteady, light-headed, or faint (9) derealization (feelings of unreality) or depersonalization (being detached from oneself) (10) fear of losing control or going crazy (11) fear of dying (12) paresthesias (numbness or tingling sensations) (13) chills or hot flushes Ps. Need to specify with or without agoraphobia

2.2.2. How is state anxiety measured?

Previously, state anxiety was measured mainly by interview. For the past decades, standardised questionnaires have been established to measure anxiety. Although questionnaires alone cannot be used as a single clinical assessment criterion, due to time and simplicity concerns, they are still popular among clinicians and researchers for primary screening before further assessments are taken. Like depression questionnaires, some anxiety questionnaires also provide cut-off points for possible clinical anxiety. Table 2.9 summarises some anxiety scales. Although there are different scales to measure anxiety, one should remember that there is no 'gold' scale, as different scales may suit different population and environments.

Table 2. 9. A list of popular anxiety measure scales used in cardiac research

Questionnaire title	Authors	Scores	Cut-off criteria
Beck Anxiety Inventory (BAI)	Beck et al. (1988, 1993a)	21 checklists, total range 0 - 63 self-rated scale	< 21: low anxiety 22 – 35: moderate anxiety > 36: high anxiety
Brief Symptom Inventory (BSI)	Derogatis & Melisaratos (1983)	A short form of Symptom Checklist-90 53 items in total with 6 items measuring state anxiety, total range 0 - 24 self-rated	No formal cut-off Normal subjects' mean = 0.35 ± 0.45 Psychiatric inpatients' mean = 1.5 ± 1.1 Psychiatric outpatients' mean = 1.7 ± 1.0
Hamilton Anxiety Rating Scale (HAM-A)	Hamilton (1959)	14 main items total range 0 – 56 Clinician-rated symptom scale	< 17: normal 18 – 25: mild 25 – 30: moderate – severe > 30: severe
Hospital Anxiety Depression Scale (HADS-A)	Zigmond & Snaith (1983)	7 items for each subscale, Total range 0 – 21 self-administered for non-psychiatric hospital settings	<7: normal 8–10: mild symptoms (borderline clinical case) 11–14: moderate symptoms (clinical case) >=15: severe symptoms
Spielberger's state-trait anxiety Inventory (STAI)	Spielberger et al. (1983ab)	20 items for state and 20 for trait anxiety, total range 20 – 80 for each subscale self-rated	No cut-off points Norm: men and women 50-60 years old are 34.5 ± 10.3 & 32.2 ± 8.7. For general psychiatric patients was 47.7 ± 13.2. For general medical-surgical patients was 42.4 ± 13.8. Ps. Fell et al (1993) used score ≥ 50; Crowe (1996) used ≥ 1standard deviation (SD); Frasure-Smith et al. (1995a), Frazier et al. (2002) & Denollet et al. (1998) used upper quartile (75th percentile) as cut-off points
Taylor Manifest Anxiety Scale (TMAS)	Taylor (1953)	50 items self-rated scale	> 19: high anxiety
The Trauma Symptom Checklist – Anxiety (TSC-A)	Briere & Runtz (1989)	33-items measuring 5 dimensions including anxiety (9 items), range from 0 – 3	X

2.2.3. What is the relationship between state anxiety and MI?

2.2.3.1. Severity and prevalence of post-MI anxiety

To understand to what extent MI patients feel anxious after the MI event, cross-sectional and prospective studies were reviewed. Table 2.10 illustrates 13 cross-sectional studies and Table 2.11 presents 15 longitudinal studies. None of these studies reported a power calculation and the number of participants ranged from 30 (Thornton and Hallas, 1999) to 912 (Moser et al., 2003). The percentage of males varied from 50% (Cherrington et al., 2004) to 100% (Bennett et al., 1999b; Strik et al., 2003; Wiklund et al., 1984) and the mean age of participants was between 53 (Thompson et al., 1987) to over 70 years (Benninghoven et al., 2006).

A. Cross-section findings

Overall, four different scales were used to measure state anxiety (STAI-state, HADS-anxiety, BSI and SCL) and different cut-off points were reported for STAI-state (e.g., upper quartile percentage, median score, 1 standard deviation).

Table 2. 10. The MI patients' anxiety prevalence in cross-sectional studies

Authors	1st MI or not	Measure time	Sample	Anxiety measure & cut-off	Prevalence of anxiety
Cherrington et al. (2004)	Mixed	24 – 48 hours in hospital	49 (50% men) age = 60.8 ± 13.32	STAI-S (no cut-off)	Mean anxiety = 38.3 ± 13.04
Frazier et al. (2002)	Mixed (69.3% 1st MI)	48 hours within hospitalisation	101 (53.5% men) age = 60.7 ± 12.8	STAI-S (75TH percentile)	No anxiety - 29.7% located in lowest quartile (20 -29) Mild - 22.8% in 2nd quartile (30-37) Moderate - 24.8% in 3rd quartile (38-44) Extremely - 21.8% in 4th quartile (45-77) Mean anxiety = 37.2 ± 12.4
Crowe et al. (1996)	Mixed (16% > 1 MI)	3 days in hospital	785 (87% men), mean age = 61	STAI-S ≥ 1 SD (STAI-S ≥ 43) (BDI > 8)	69% scored more than the cut-off points for anxiety and depression 10% scored higher than psychiatric patients' mean score (> 56) Men = 43 ± 10; women = 43 ± 11 With previous MI = 43 ± 11; 1st MI = 43 ± 10 Ps. demographic data and MI severity had no relationship to anxiety and depression
Watkins et al. (2002)	Mixed (22% > 1 MI)	6 ± 3 days hospitalisation	167	STAI-S > 30 (median score)	49.1%
Frasure-Smith et al. (1995a)	Mixed	T1: 5-15 days post-MI	T1: 222 (78% men) no age limit	STAI-S (75th percentile, STAI-S ≥ 40)	26.4 % (57 out of 216)
Frasure-Smith et al. (1999)	Mixed	T1: in hospital	896 (623 men)	STAI-S > 43	Women: 35.9% (mean = 39.5 ± 12.8) Men: 18.8% (mean = 34.1 ± 10)
Denollet & Brutsaert (1998)	Mixed (26.7% > 1 MI)	3-6 weeks post-MI	87 (93% men) Age = 55.1 (41-69)	STAI-S (75th percentile, STAI-S ≥ 48)	31%
Bennett et al. (1999b)	**Yes**	Post-discharge	43 men (& wives) men age = 65 ± 8.2	HADS-A ≥ 8	40% men 60% wives
Bjerkeset et al. (2005)	**Yes**	2- 5 years after MI	512 (71.8% men, women were older) Mean age = 56.2	HADS-A ≥ 8	Women: MI within 2 years – 32.6% were anxious; MI between 2-5 years – 16.6% were anxious Men: MI within 2 years – 14.7% were anxious; MI 2-5 years – 12% were anxious Interaction effect of gender and time was significant for depression but marginally for anxiety
Moser & Dracup (1996)	Mixed	2 days in hospital	86	BSI (Derogatis, 1983) (no cut-off but compared with psychiatric patients (mean = 1.7)	26%> 1.7
Moser et al. (2003)	Mixed	3 days in hospital	912 (72.1% men)	BSI (Derogatis, 1983) (no cut-off, but compared with psychiatric patients = 1.7)	Total mean score was 44% higher than norm 16% women & 8% men > 1.7
Moser et al. (2007)	Mixed	5 days post-MI	536 (66.4% men)	BSI (Derogatis, 1983) (no cut-off, but compared with psychiatric patients = 1.7)	48.9% > 1.7, of whom 63% were males
Strik et al. (2003)	**Yes**	1 month post-MI	318 men Age = 58 ± 11	SCL for anxiety (10 items) (SCL-90) (Derogatis, 1973; Arrindell, 1981) ≥ 12	59.5%

BSI: Brief Symptom Inventory; HADS: Hospital Anxiety and Depression Scale; SCL: Symptom Check List; STAI: State-Trait Anxiety Inventory

Three studies examined first-time MI patients. Bennett et al. (1999b) found that 40% of their MI patients were anxious soon after hospital discharge. Strik et al. (2003) reported 59.5% were anxious at 1-month post-MI and Bjerkeset et al. (2005) reported 28.6% were anxious at 2-5 years post-MI.

Ten studies examined in-hospital anxiety among mixed MI patients and the prevalence rates of anxiety varied. For example, Moser et al. (2003) used mean BSI > 1.7 and found 8% of their MI patients were anxious. Crowe et al. (1996) used STAI-state ≥ 43 and reported 69% of the MI patients were anxious. If one compares those used STAI-state, the percentage of high anxiety ranged from 18.8% (for men only, STAI > 43. Frasure-Smith et al., 1995a) to 49.1% (STAI > 30, Watkins et al., 2002).

Although some early studies have found that patients with a MI history tended to be more anxious at the time of a recurrent MI (Gentry & Haney, 1975; Rosen & Bibring, 1966), more recently, Crowe et al. (1996) was unable to support these findings. It may be possible these improvements in MI treatment over the past 20-30 years has increased patients' confidence and knowledge, resulting in patients with previous MI being no more anxious than those with first-time MI.

B. longitudinal findings

During hospitalisation, between 16% (Crowe et al., 1996) to 72% (Benninghoven et al., 2006) of MI patients reported high anxiety. One to three months after hospital discharge, MI patients' anxiety prevalence varied between 18% (Stern, 1977) to 65% (Wiklund et al., 1984). Finally, Havik and Maeland (1990) reported 31% of their participants were anxious at 3-5 years post-discharge.

Of the studies that examined anxiety stability, four reported that anxiety remained stable; another four studies found that anxiety significantly decreased, and two studies reported that anxiety fluctuated over time. A number of reasons may explain this inconsistency. First, as different assessment times were used to measure anxiety, it is difficult to compare different longitudinal studies. Also, when the sample size is small, it probably was not ideal to use a mean score to represent anxiety level. In addition, as several studies only measured anxiety twice, it may not be able to correctly reflect anxiety stability. For example, Thompson et al. (1987) found that state anxiety would not start to decrease to normal level until 1-year post-MI. Havik & Maeland (1990) particularly pointed out that anxiety remained stable during hospitalisation until hospital discharge. After discharge, anxiety levels increased until two weeks later. Therefore, it probably is better to measure anxiety at least at three different time points.

Why did anxiety prevalence vary among studies?

Like the prevalence rate of depression, anxiety prevalence also varied widely between studies. It may be possible that different measuring time-points, measuring tools, and cut-off criteria all contributed to this variance. Also, participants' characteristics and cultural differences could also influence anxiety levels.

Table 2. 11. The MI patients' anxiety prevalence in longitudinal studies

Authors	1st MI or not	Sample	Depression measure & cut-off	< 3 days in hospital (%)	3-days to discharge (%)	Within 1 month post discharge (%)	1-3 months post-discharge (%)	3-6 months post-discharge (%)	6-12 months post-discharge (%)	> 1 year post-discharge (%)	Persistence of state anxiety
Benninghoven et al. (2006)	mixed	76 Age > 70	STAI-S Luebeck Interview for Psychosocial Screening (LIPS, Benninghoven et al., 2003) cut-off using score > 3		1-weel in-hospital: Total: 72% Mild: 24%, Moderate: 18%, High: 18%, Very high: 12%					31 month post-MI: X	Mean anxiety decreased significantly
Lane et al. (2000ab; 2002a)	Mixed (T1: 21% > 1 MI)	T1: 288 (74.7% men, 3% with pre-MI depression, 52% with cardiac failure); age = 62.7 ± 11.5 T2: 189 T3: 156	STAI-S ≥ 40		2-15 days in hospital: 26.1% (more women, younger, less education) mean = 33.2 ± 11.9) (At T1, 51% of the 26.1% experienced both depression and anxiety)			4-month post-MI: 41.8% (mean = 37.8 ± 13.8)	12-month post-MI: T3: 40.0% (mean = 36.8 ± 13.8)		T1-T2-T3 anxiety highly correlated, and 75% of T1 anxious were still anxious at T2 Ps. Some of T1 non-anxious still became anxious at T2 and T3 Overall, 52.6% were anxious at some point during the first year post-MI.
Crowe et al. (1996)	mixed (17% > 1 MI)	201 (88% men)	STAI-S ≥ 1 SD (= 43)		3-day in hospital: 16% scored more than for psychiatric patients (> 55)				12-month post-MI: X		High anxious patients at T1 remained higher than general medical surgical population at T2 Ps. demographic data had no relationship to anxiety and depression
Van Elderen et al. (1999)	mixed	T1: 278 mean age = 54 ± 8.45 T2: 278 T3: 232	STAI-S			1-month post-MI: X	3-month post-MI: X		12-month post-MI: X		Anxiety decreased significantly over time ($p < 0.01$)
Thompson et al. (1987)	**Yes**	76 men mean age = 53	1. STAI-S 2. Self-rating scale (Thompson, 1982) (unknown cut-off points)	1-day in hospital: STAI = 41.8 ± 11.6	5-day in hospital: STAI = 40.0 ± 12.1		6-week post-MI: STAI = 42.0 ± 10.0		12-month post-MI: STAI = 33.3 ± 6.3		Both STAI and self-rating anxiety level changed significantly over 1 year. T1 reduced to T2, then it increased to T1 level at T3 (resuming previous activities). At T4 anxiety decreased again.
Stern et al. (1977)	mixed	68 (80.9% men)	TMAS (Taylor, 1953) ≥ 19		In-hospital: 22%		6-week post-MI: 18.9% 3-month post-MI: 18%	6-month post-MI: 14%	12-month post-MI: 15.9%		
Havik & Maeland (1990)	mixed	T1: 383 T2: 283	SED (Havik, 1982, range 4 – 28) ≥ 14		9 days after admission: 20% Before discharge: 21%	1-2 weeks post-discharge: 34%	6-week post-discharge: 34%	6-month post-discharge: 31%		3-5 years post-discharge: 31%	Average anxiety was stable between T1 to T2, but it increased significantly at T3 and then remained similar to the level of T3 until T6

HADS: Hospital Anxiety and Depression Scale; LIPS: Luebeck Interview for Psychosocial Screening; MAAC: Multiple Affect Adjective Checklist; STAI: State Trait Anxiety Inventory; TMAS: Taylor Manifest Anxiety Scale; TSC: Trauma Symptom Checklist

(continued)

Authors	1st MI or not	Sample	Depression measure & cut-off	< 3 days in hospital (%)	3-days to discharge (%)	Within 1 month post discharge (%)	1-3 months post-discharge (%)	3-6 months post-discharge (%)	6-12 months post-discharge (%)	> 1 year post-discharge (%)	Persistence of state anxiety
Benninghoven et al. (2006)	mixed	76 Age > 70	STAI-S; Luebeck Interview for Psychosocial Screening (LIPS, Benninghoven et al., 2003) cut-off using score > 3		1-week in hospital: STAI = 41 ± 10.8 LIPS = 2.6 ± 1.4					31-month post-MI: STAI = 35.8 ± 9.9 LIPS = 1.5 ± 0.9	Mean state anxiety (STAI or LIPS) decreased significantly between T1 and T2 ($p < 0.001$)
Mayou et al. (2000)	Mixed (22% > 1 MI) (29% had angina)	T1: 347, (73% men) age = 63.16 T2: 243 T3: 224	HADS-A ≥ 8 (probably clinical anxiety ≥ 10 borderline anxiety: 8 – 10) Emotional disorder (distressed): using HADS-depression > 10 or combined HADS >19		3-days in hospital: HAD-A 8-10: 19.1% HAD-A ≥10: 18.5 % HADS > 19: 14.8% Distress correlated with younger age, psychological histories, low quality of life at T1, smokers, longer hospital stay.		3-month post-MI: X		12-month post-MI: X		In-hospital to 3 months: improved, 3-12 months: remained stable. Overall, anxious patients were more anxious all the time than non anxious group Those were distressed at T1 had a higher percentage of remained distressed at T2 and T3, but those who were not distressed at T1 seldom became distressed at later stages
Dickens et al. (2006)	**Yes**	260	HADS-A ≥ 8		In hospital			6-month post-MI: X	12-month post-MI: X		Mean anxiety remained stable
Thornton & Hallas (1999)	**Yes**	30, age = 64.2 ± 3.2	HADS–total score Borderline: 8-10 Clinical case: ≥ 11			4-week post-MI: X				18-month post-MI: X	Mean anxiety decreased significantly over time (T1 7.7 ± 5.0; T2: 4.1 ± 4.0, $p < 0.01$)
Bennett et al. (1999ac)	**Yes**	T1: 43 T2: 37	HADS-total score ≥ 11		In hospital: 11.6% were both anxious and depressed		3-month post-MI: 21.6% were anxious, 2.7% was depressed.				Mean anxiety remained stable over time (mean depression decreased over time)
Jacobsen et al. (1992b)	**Yes**	42 (55% men)	MAAC (Zuckerman, 1965) , with 21 anxiety related adjectives (unknown cut-off)		3-day in hospital: X			3-5 months post-MI:X			Mean anxiety remained stable over time (8.00 ± 5.14 vs. 6.51 ± 4.82, $p = 0.316$)
Pedersen et al. (2004)	**Yes**	T1: 112 T2: 104, age = 61 ± 9.5	TSC (Briere, 1989) (unknown cut-off)				4-6 weeks post-MI: X		9-month post-MI: X		Mean anxiety remained stable over time ($p = 0.79$)
Wiklund et al. (1984)	**Yes**	177 men median age = 54	Interview (unknown cut-off)				2-month post-MI: 65%		12-month post-MI: 60%		

HADS: Hospital Anxiety and Depression Scale; LIPS: Luebeck Interview for Psychosocial Screening; MAAC: Multiple Affect Adjective Checklist; STAI: State Trait Anxiety Inventory; TMAS: Taylor Manifest Anxiety Scale; TSC: Trauma Symptom Checklist

2.2.3.2. State anxiety and MI patients' physical functioning

Table 2.12 presents research on MI patients' anxiety and physical outcomes. Seventeen studies were reviewed and thirteen examined mixed MI patients. Five studies used cross-sectional design. Of those using longitudinal design, the length of follow-up ranged from hospitalisation up to five years post-MI.

Of the five cross-sectional studies, three reported that in-hospital anxiety was an independent predictor of in-hospital cardiac complications (Moser et al., 1996; 2007; Watkins et al., 2002). Although Cherrington et al. (2004) did not report a positive finding, as they only examined 49 MI patients, their finding may be underpowered.

Of the longitudinal studies, seven examined the relationships between baseline anxiety and follow-up physical functioning (e.g., cardiac events, physical complaints, health care consumptions, blood pressure and heart rate) and four examined anxiety and mortality. The results showed that some of these studies supported anxiety as an independent predictor but some studies did not.

Although one could not conclude that anxiety definitely has a negative effect on MI patients' physical progress, one should bear in mind that many factors may account for this. These may include MI patients' characteristics, different measuring tools and other confounding variables. As these were discussed in the sections related to depression, it will not be repeated here.

Table 2. 12. State anxiety and MI patients' physical functioning

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated anxiety related to physical morbidity	Control variables for morbidity	Estimated anxiety related to cardiac/all-cause mortality	Control variables for mortality
Benninghoven et al. (2006)	mixed	T1: 1 week post-MI T2: 31 months post-MI	76 Age > 70	STAI-S Luebeck Interview for Psychosocial Screening (LIPS, Benninghoven et al., 2003) cut-off using score > 3	31-month post-MI cardiac events predicted by 1-week anxiety – Univariate analysis: Yes (for LIPS anxiety, p = 0.02) Multivariate analysis: Yes (for LIPS anxiety) Other significant predictors: Age, partnership, diabetes	Age, sex, partnership, employment, LIPS (social support, vital exhaustion, depression, anxiety), CAD history, family CAD history, smoking blood pressure, hypercholesterolemia, diabetes, MI site, LVEF, multi-vessel disease	X	X
Cherrington et al. (2004)	Mixed	24 – 48 hrs hospitalisation	49 (50% men); age = 60.8 ± 13.32	STAI	In-hospital complications (determined by chart audit) predicted by in-hospital anxiety - Univariate analysis: No. Multivariate analysis: No (p = 0.39). Significant predictors: total illness perception score (State anxiety did not mediate illness perceptions and complications)	Age, social economic status, sex, LVEF, thrombolysis, illness perceptions	X	X
Watkins et al. (2002)	Mixed (22% > 1 MI)	6 ± 3 days hospitalisation	167	STAI-S (median score > 30)	In-hospital impaired autonomic control (reduced baroreflex cardiac control) predicted by in-hospital anxiety – Multivariate analysis: Yes. Anxious patients had much lower baroreflex cardiac control (β = -0.14, p < 0.05), Other significant predictors: age, respiratory frequency	Age, blood pressure, respiratory rate,	X	X
Denollet & Brutseart (1998)	Mixed (26.7% > 1 MI)	T1: 2-months post-MI T2: 6-10 years (mean 7.9 years) post-MI	T1: 91 T2: 87 (93% men) mean age = 55.1	STAI-S ≥ 48 (75th percentile)	6-10 years cardiac events (cardiac death or nonfatal MI) - Univariate analysis: Yes (OR = 3.7, p = 0.04) Multivariate analysis: No Significant predictor: Type D personality (OR = 4.7, p = 0.001), LVEF (OR = 3.0, p = 0.02)	LVEF, three-vessel disease, poor exercise tolerance, previous MI, anxiety, depression, Type B behaviour, Type D personality	X	X
Frasure-Smith et al. (1995a)	mixed	T1: 5-15 days in hospital T2: 6-months post-MI T3: 12-months post-MI	T1: 222 (78% men) no age limit mean age = 60 T2, T3: 170	STAI-S ≥ 40 (upper quartile)	T3 cardiac recurrent predicted by in-hospital anxiety – Multivariate analysis: Yes (OR = 2.52, p = 0.021)	Previous MI, ACE inhibitors prescription at discharge, previous depression, depressive symptoms	X	X
Frasure-Smith et al. (2003)	mixed	T1: hospitalisation T2: 1-year post-MI T3: 5-year post-MI	896 (74.1% men) age = 59.4 ± 11.2 (4% with depression history)	STAI-S > 43	X	X	1 & 5-year post-MI(cardiac) morality predicted by in hospital anxiety – Univariate analysis: No difference between anxious vs. not anxious groups at either 1-year or 5 years.	Age, sex, education, marital status, smoking, previous MI, diabetes, thrombolysis, Killip class, Q-wave-MI, LVEF, revascularisation during admission, β blocker at discharge, in-hospital depression, 1-year depression, anxiety
Thomas et al. (1997)	Mixed (37.6% > 1 MI)	T1: in hospital T2: 3-6 months post-MI	T1: 424 T2: 348	STAI-S (no cut-off)	X	X	6-month mortality predicted by in-hospital depression – Multivariate analysis: Yes (OR = 1.06, p = 0.0076) Other significant predictors: future life events (OR = 1.18, p = 0.0026), past life events (OR = 1.14, p = 0.0022)	LVEF, diabetes, anger out, future life events, past life events

BSI: Brief Symptom Inventory ; HADS: Hospital Anxiety and Depression Scale; LIPS: Luebeck Interview for Psychosocial Screening; SCL: Symptom Check List; STAI: State Trait Anxiety Inventory; TSC: Trauma Symptom Checklist

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Estimated anxiety related to physical morbidity	Control variables for morbidity	Estimated anxiety related to cardiac/all-cause mortality	Control variables for mortality
Lane et al. (2000ab, 2001a; 2002b; 2005)	Mixed (21% > 1 MI)	T1: 2-15 days in hospital T2: 4-months T3: 12-months T4: 3-years	T1: 288 (74.7% men, 3% with depression history, 52% with cardiac failure); age = 62.7 ± 11.5 T2: 263 T3: 257 T4: 250	T1: STAI-S	X	X	4, 12 & 36-month cardiac mortality predicted by in-hospital anxiety – 4-month mortality: No prediction. Univariate analysis of significant contributors: Peel index, Killip class, hospital stay. 12-month mortality: No prediction. Univariate analysis of significant predictors: age, partnership, education, Peel Index, Killip class, hospital stay. 3-year mortality: No prediction. Multivariate analysis of significant predictors: Killip class, peel index, age, cardiac severity and the prescription of Warfarin.	No controlled variables No controlled variables Age, education, Killip class, hospital stay, Peel index, depression, depression, medication on discharge,
Mayou et al. (2000)	Mixed (22% > 1 MI) (29% angina)	T1: 3 days in hospital T2: 3-months T3: 12-months T4: 18 months	T1: 344 (73% men) age = 63.16 (30-79) T2: 243 T3: 224	Emotional disorder/distressed: HADS-D > 10 or combined HADS >19	12 & 18-month physical complaints – In-hospital & 3-month emotional distress did not predict physical complaints.	unknown	12 & 18 month mortality – In-hospital and 3-month depression did not predict for Cox regression model	unknown
Moser et al. (1996)	mixed	48 hours within admission	86	Brief Symptom Inventory (Derogatis, 1983) (no cut-off)	In hospital cardiac complications (including mortality) - Univariate analysis: Yes (More complications were seen in higher anxiety group, p = 0.001) Multivariate analysis: Yes (OR = 4.9, p = 0.003) Other significant predictors: Killip class (OR = 2.7, p = 0.001)	Age, sex, worst chest pain, thrombolysis, Killip class, anxiety	X	X
Moser et al. (2007)	Mixed (27% > 1 MI)	5 days post-MI	536 (66.4% men) Age = 62 ± 14	Brief Symptom Inventory (Derogatis, 1983) (no cut-off)	In-hospital cardiac complications – Univariate analysis: Yes Multivariate analysis: Yes (OR = 1.5, p = 0.01) Other significant predictors: previous MI (OR = 2.3, p = 0.006), LVEF (OR = 0.97, p = 0.04) , anxiety x perceived control (OR = 1.3, p = 0.01) Ps. Perceived control moderated anxiety: high anxiety and low perceived control is associated with the highest risk of complications	Age, sex, LVEF, MI site, aspirin or β-blocker in A&E, anxiolytic use, anxiety, level of perceived control	X	X
McGowan et al. (2004)	**Yes**	3.6 ± 3.4 days in hospital	305	HADS-A ≥ 8	In-hospital symptoms of vital exhaustion – Bivariate analysis: Yes. Anxiety correlated with vital exhaustion (r = 0.56, p < 0.01) Number of co-morbidity – Bivariate analysis: No correlation (r = 0.10, p = 0.074)	Age, sex, number of co-morbidity Age, sex		
Pedersen et al. (2004)	**Yes**	T1: 4-6 week post-MI T2: 9 months	T1: 112 T2: 104 (age = 61 ± 9.5)	TSC-anxiety (no cut-off)	9-month recurrent cardiac events predicted by 4-week anxiety - Univariate analysis: No Multivariate analysis: No (OR = 0.94, p = 0.60) Significant predictor: T1 total low social support (OR = 0.9, p < 0.01)	Intrusion, avoidance, arousal, PTSD< depression, somatic complaints, total support, support satisfaction	X	X
Strik et al. (2003)	**Yes**	T1: 1-month post-MI T2: 3.4 years post-MI	318 men (age 58 ± 11)	SCL-anxiety (10 items) ≥ 12	T2 health care consumption predicted by T1 anxiety -- Univariate analysis: Yes (OR = 2.0, p = 0.006) Multivariate analysis: Yes (OR = 2.0, p = 0.005)	anxiety	T2 cardiac events (death or re-occurrence) predicted by T1 anxiety – Univariate analysis: Yes (HR = 3.01, p = 0.019) Multivariate analysis: Yes (HR = 2.79, p = 0.03) Other significant predictor: age ((HR = 2.44, p = 0.047) LVEF (HR = 2.29, p = 0.047)	Age, LVEF (≤ 50%), depression, hostility, use of antidepressants
Thornton & Hallas (1999)	**Yes**	T1: 4-week post-MI T2: 18 months	30 (age = 64.2 ± 3.2)	HADS –depression and anxiety Total ≥ 11 = clinical case Total: 8 – 10 = borderline	T1 blood pressure & heart rate predicted by 4-week anxiety – Multivariate analysis: Yes. T1 anxiety independently accounted for diastolic blood pressure, systolic blood pressure and heart rate (p < 0.05) T2 blood pressure & heart rate – Multivariate analysis Yes. T2 anxiety also explained T2 systolic, diastolic blood pressure and heart rate Ps. T1 depression was also a significant predictor	Global mood (positive and negative dimensions), depression, hardiness	X	X

BSI: Brief Symptom Inventory ; HADS: Hospital Anxiety and Depression Scale; LIPS: Luebeck Interview for Psychosocial Screening; SCL: Symptom Check List; STAI: State Trait Anxiety Inventory; TSC: Trauma Symptom Checklist

2.2.3.3. State anxiety and MI patients' psychosocial wellbeing

Table 2.13 reviews eight studies of state anxiety and MI patients' psychosocial progress. These studies were all prospective and the study length varied from three months to five years post-MI. Three studies measured first-time MI patients and all eight studies measured in-hospital state anxiety as the baseline anxiety.

Five studies measured quality of life at 4, 6 and 12-month post-MI and three reported in-hospital anxiety either independently predicted or correlated with quality of life (French et al., 2005a; Lane et al., 2000ab, 2001ab, 2002b, 2005; Mayou et al., 2000).

Table 2. 13. State anxiety and MI patients' psychosocial wellbeing

Authors	1st MI or not	Measure times	Sample	Anxiety measure & cut-off	Estimated anxiety related to psychological wellbeing	Control variables for psychological wellbeing	Result summary
Brink et al. (2002a) (2005)	**Yes**	T1: 4-6 days in hospital T2: 5 months T3: 1 year	T1-T2: 114 (67.5% men) Age (M) = 65.4 ± 10.1 Age (W) = 72.2 ± 8.6 T3: 98 (66.3% men) Age (M) = 64.6 ± 9.8 Age (F) = 71.4 ± 8.7	HADS ≥ 8 possible anxiety HADS ≥ 11 probable anxiety	5-month QoL (SF-36, Ware et al., 1994) predicted by in-hospital anxiety - No prediction 5-month QoL predicted by 5-month anxiety - Only 5-month health complaints predicted physical QoL. 5-month depression and 5-month health complaints predicted 5-month mental QoL 1-year QoL (SF-36, Ware et al., 1994) - Females: in-hospital & 5-month depression and age predicted 1-year physical QoL.. 5-month depression and 1-year fatigue predicted 1-year mental QoL. Males: 5-month depression and 1-year fatigue predicted 1-year physical quality of life. Age, in-hospital depression, 5-month depression and 1-year fatigue predicted 1-year mental QoL.	 5-month anxiety, sense of coherence, coping (5 types), and health complaints 5-month anxiety, sense of coherence, coping (3 types) and health complaints Age, 1-year fatigue	Multivariate: No Multivariate: No Multivariate: No
Bjerkeset et al. (2005)	**Yes**	T1: in hospital T2: 2- 5 years	512 (71.8% men, women were older) Mean age = 56.2 (35-79)	HADS-A ≥ 8	2-5 years depression predicted by in-hospital depression and anxiety - Yes for both men and women (both p = 0.001) 2.5 years anxiety predicted by in-hospital depression and anxiety – Yes for both men and women (both p = 0.001) Within 2 years post-MI: women had a high risk of both depression and anxiety. After 2-5 years post-MI: men increased risk of depression, but not anxiety. Interaction effect of gender and time was significant for depression but marginally for anxiety	MI history, age, education (> 9), employ status, marriage status, excessive alcohol intake, BMI, exercise frequency per week	Multivariate: Yes
Dickens et al. (2006)	**Yes**	T1: in-hospital T2: 6 months T3: 12 months	260	HADS ≥ 8	1-year QoL (SF-36 physical component, Ware et al., 1994) – Predicted by in-hospital anxiety: NO (multivariate analysis)) Predicted by 6-month anxiety: Yes (multivariate analysis, p = 0.037; so did depression), and it was mediated by 'fatigue' feeling, after controlling Other significant predictors: age (p = 0.001), in-hospital physical components, smoking, depression (p = 0.004) and cardiac events	Block 1: Age, sex, marital status, education (< 12), socio economic status, baseline SF-36 physical component score, Block 2: current rheumatic, respiratory, gastrointestinal or other diseases, ongoing Block 3: ongoing cardiac risk factors (diabetes, serum cholesterol, hypertension, previous cardiac disease, smoking history), MI severity (Killip class, CPK), MI site, thrombolysis or surgical intervention at admission, medication on discharge, cardiac events during the subsequent 12 months Block 4: in-hospital (or 6-month) HADS anxiety and depression	Multivariate: No for T1 anxiety Yes for T2 anxiety
Bennett et al. (1999a)	**Yes**	T1: in hospital T2: 3 months later	T1: 43 T2: 37	HADS ≥ 11	3-month exercise, alcohol consumption, smoking - Anxiety did not significantly correlate with these behaviours	No multivariate analysis was conducted on anxiety	Bivariate: NO

HADS: Hospital Anxiety and Depression Scale; STAI: State Trait Anxiety Inventory

(continued)

Authors	1st MI or not	Measure times	Sample	Anxiety measure & cut-off	Estimated anxiety related to psychological wellbeing	Control variables for psychological wellbeing	Result summary
French et al. (2005a)	Mixed (18.6% > 1 MI)	T1: 1-day in hospital T2: 6 months	T1: 194 (158 1st MI) T2: 154	HADS-A	6-month rehabilitation attendance predicted by in-hospital anxiety- Univariate analysis: No Significant variables: old age, smokers, unemployed (less likely to attend)	NO	Rehabilitation attendance: No
					6-month Quality of Life for MI (QLMI, Lim, 1993) predicted by in-hospital anxiety – Bivariate: Yes (anxiety negatively correlated with emotional, physical and social QoL, $p < 0.05$) Multivariate analysis: Yes (for emotional QoL). Other significant predictors: depression and illness consequences (for physical QoL, emotional QoL and social QoL)	Step 1: Anxiety, depression, confidence in recovery, Step 2: illness consequences,	QoL: Multivariate: Yes
Lane et al. (2000ab, 2001ab; 2002b; 2005)	Mixed (21% > 1 MI)	T1: 2-15 days in hospital T2: 4-months T3: 12-months	T1: 288 (74.7% men, 3% with depression history, 52% with cardiac failure); age = 62.7 ± 11.5 T2: 263 T3: 257	T1: STAI-S (unknown cut-off)	4 & 12-month QoL (Dartmouth COOP charts, Nelson, 1990) predicted by in-hospital state anxiety– 4-month QoL: multivariate analysis - Yes ($\beta = 0.18$, $p = 0.02$). Other significant contributors: Peel index ($\beta = 0.24$, $p = 0.001$), partnership ($\beta = 0.22$, $p = 0.002$), depression ($\beta = 0.20$, $p = 0.0001$).	Age, sex, partnership, living condition, employment, exercise, depression, Peel index, depression, trait anxiety, hospital stay	Multivariate: Yes
					12-month QoL: Multivariate analysis: Yes ($\beta = 0.10$, $p = 0.008$) Other significant predictors: living condition ($\beta = 3.79$, $p = 0.001$), Peel Index ($\beta = 0.34$, $p = 0.001$), depression ($\beta = 0.21$, $p = 0.001$). Ps. Baseline QoL was not controlled	Gender, partnership, living condition, employment, exercise frequency, depression, state/trait anxiety, Peel Index, Killip class, hospital stay,	Multivariate: Yes
					6-8 weeks post-MI rehabilitation attendance predicted by in-hospital depression – Univariate analysis: No. Significant predictors: deprivation score (OR = 1.2, $p < 0.001$), employment status (OE = 2.33, $p = 0.005$), frequency of previous exercise behaviour (OR = 0.88, p = 0;001), Thrombolysis (OR = 1.8, p = 005)	Sex, partnership, living condition, employment, deprivation score, frequency of previous exercise, depression, trait anxiety, Peel Index, previous MI, angina pectoris, thrombolysis	Univariate: Yes Multivariate: No
Sykes et al. (1989)	mixed	T1: day 3 post-MI T2: day 6-11 post-MI T3: 3-months post-MI	569 (72.2% men)	STAI-S (unknown cut-off)	3-month post-MI return to work predicted by 3-day post-MI anxiety – Bivariate analysis: NO (Anxiety was not correlated with return to work or not)	No	Bivariate: No
Mayou et al. (2000)	Mixed (22% > 1 MI) (29% angina)	T1: 3 days in hospital T2: 3-months T3: 12-months T4: 18 months	T1: 344 (73% men) age = 63.16 (30-79) T2: 243 T3: 224	Emotional disorder/distressed: HADS-D > 10 or combined HADS >19	12-month QoL (SF-36, Ware, 1992) – Univariate analysis: Yes. (In-hospital & 3-month emotional distress had more physical complaints and everyday activities, more health service usage, and lifestyle changes).	NO	Univariate: Yes (but no clear comparison results and p value)

HADS: Hospital Anxiety and Depression Scale; STAI: State Trait Anxiety Inventory

Research quality of the reviewed studies

Although each study has its own limitations, a number of the reviewed studies showed a better research quality than others. For example, when examining prevalence of depression or anxiety, Dickens et al. (2004b, 2005, 2006) not only recruited more than 300 first-time MI patients at hospital admission but also followed these patients for one year. They used both standardised clinical interviews and scales to measure depression disorders/depressive symptoms and state anxiety. Meanwhile, they also separated depressed patients from non-depressed ones and examined their long-term depression development. The studies of Brink et al. (2002a, 2005), Pedersen et al. (2004) and Strik et al. (2001, 2004) all used a longitudinal design of first-time MI patients to track long-term depression/anxiety.

When examining the relationships between depression/anxiety and MI, studies should be longitudinal, with a large sample size, should control for possible confounding variables and preferably use first-time MI patients, such as Strik et al. (2004), Welin et al. (2000), Bjerkeset et al. (2005), Drory et al. (1999, 2002) and Dickens et al. (2004b, 2005, 2006).

2.3. Conclusion

This chapter reviewed MI patients' depression and anxiety, from hospitalisation to convalescence stage and chronic phase. Although the prevalence rates of depression and anxiety varied between studies, several factors could have contributed to this (e.g., different measurement tools, different measures of time, cut-off points, and participant's characteristics, etc). Due to similar reasons, the past studies also could not generate conclusions on the relationships between depression/anxiety and post-MI survival/physical functioning. However, this review has shown that although studies had their own design limitations, depression and anxiety have shown to have a negative effect on post-MI progress in several studies and future work should try to improve study design in order to understand more about the influences of depression and anxiety on post-MI progress.

CHAPTER THREE – ILLNESS PERCEPTIONS, SOCIAL SUPPORT AND COPING WITH MI

When people suffer from an MI, they often not only respond to it with negative moods such as depression and anxiety, but also form their own beliefs toward their MI event and consider how to deal with it. It is natural that they will be in need of help and support from others. People who are close to them will also feel the responsibility to help and support them.

Within Health psychology, it has been a main concern to understand how people perceive their illness, how they cope and whether they will benefit from others' support. In the area of MI, it has been suggested illness perceptions, social support and coping play important roles.

3.1. Illness perceptions

3.1.1. What are illness perceptions?

'Illness perceptions' was first mentioned in the Common Sense Model of Illness (CSMI, Leventhal et al., 1980), which was generated from the concepts of the social cognition approach. To understand illness perceptions, it is important to understand the background of the social cognition approach and CSMI. Therefore, section 3.1.1.1 and 3.1.1.2 introduce the concepts of social cognition and CSMI (Leventhal et al., 1980), before introducing illness perceptions in 3.1.1.3.

3.1.1.1. The social cognition approach

The social cognition approach originally emerged from the information-processing perspective in cognitive psychology. This approach is based on the conviction that constructs which are relevant to human cognitive representations and processes are fundamental for researchers in understanding all human responses, regardless of whether these responses are social or non-social in nature (Ostrom, 1994). These schematic concepts now apply to social and health psychology in examining human behaviours; and several social cognition models have been developed.

Social cognition models can be divided into two main streams. One is to predict healthy behaviours, to treat and adapt to diseases. Models from this stream include "Health Belief Model" (Becker et al., 1977), "Theory of Reasoned Behaviour" (Fishbein & Ajzen, 1975), "Theory of Planned Behaviour" (Azjen, 1985), "Health Locus of Control" (Wallston et al., 1978), and "Self-efficacy Model" (Bandura, 1977; Schwarzer & Fuchs, 1996). These models focus on five main types of variables (Leventhal et al, 2001):

- The cognitive processes of perceiving the vulnerability/threat to disease (Becker et al., 1977);
- The availability of managing actions and emotional reactions to the threat (Lazarus & Launier, 1978);
- The intentions to act to decrease/avoid the threat (Fishbein & Ajzen, 1974);
- The perception of important others' views of healthy and risky behaviours (Fishbein & Ajzen, 1974);
- The perceptions of self-efficacy in performing healthy behaviours (Bandura, 1977; Clark & Zimmerman, 1990).

Although all of these models have been used to predict or explain individuals' health behaviours in different areas, e.g., lifestyle changes, health check-ups and adherence to medical treatments, etc., they all seem to have the following three shortcomings:

- All these models assume there is a static linear relation between each factor. In this linear relation, they assume that if the signal of factor one (antecedent) is strong enough or reaches its 'threshold', it will send signals to the next factor, and so on. This is not a true representation of real life.
- These models assume that individuals act and make decisions rationally. However, they neglect the fact that other factors, which mainly are concerned with emotional responses, can play an equally important role when a person acts or makes decisions.
- These models assume individuals passively respond to information they receive, but not actively approaching external information, integrating it and then keeping that information meaningful to themselves.

The second main stream focuses on the construct generated by individuals in explaining their mental representations in health and illness. These models include "Self-Regulation and Adaptation" (Kanfer, 1977), "Common-Sense Model of Illness" (CSMI,

Leventhal et al., 1980), "Mental Representation in Health and Illness" (Skelton & Croyle, 1991) and "Illness Cognition" (Croyle & Barger, 1993). These models are driven by three fundamental concepts:

Individuals are active problem-solvers and their mental system is like a self-regulation system. When individuals detect any change of original stable somatic state, they will make efforts to make sense of the change so they can control or avoid those changes which may be perceived as signs of possible illnesses/disorders. Adaptation is a product of a problem-solving process, and therefore the ultimate goal of these actions and processes is to manage and adapt oneself appropriately to the illnesses/ disorders.
The process of adaptation or coping is based on individuals' subjective (common sense) beliefs and appraisals, although these beliefs and appraisals may not correctly reflect the objective and biomedical nature of the illness or the correct procedure to its control/treatment.
The concept of 'common sense' is the product of the individual's attitudes and beliefs of their cultural, experiences and social environment. The social environment could include family, friends, health authorities, or media, etc. All of these will constrain and shape the individual's self-regulation systems.

Summarising the above three fundamental concepts, it is clear that four features formulate the key components among these models: "*personal representations*", "*problem solving*", "*coping procedures*" and "*appraisals*".

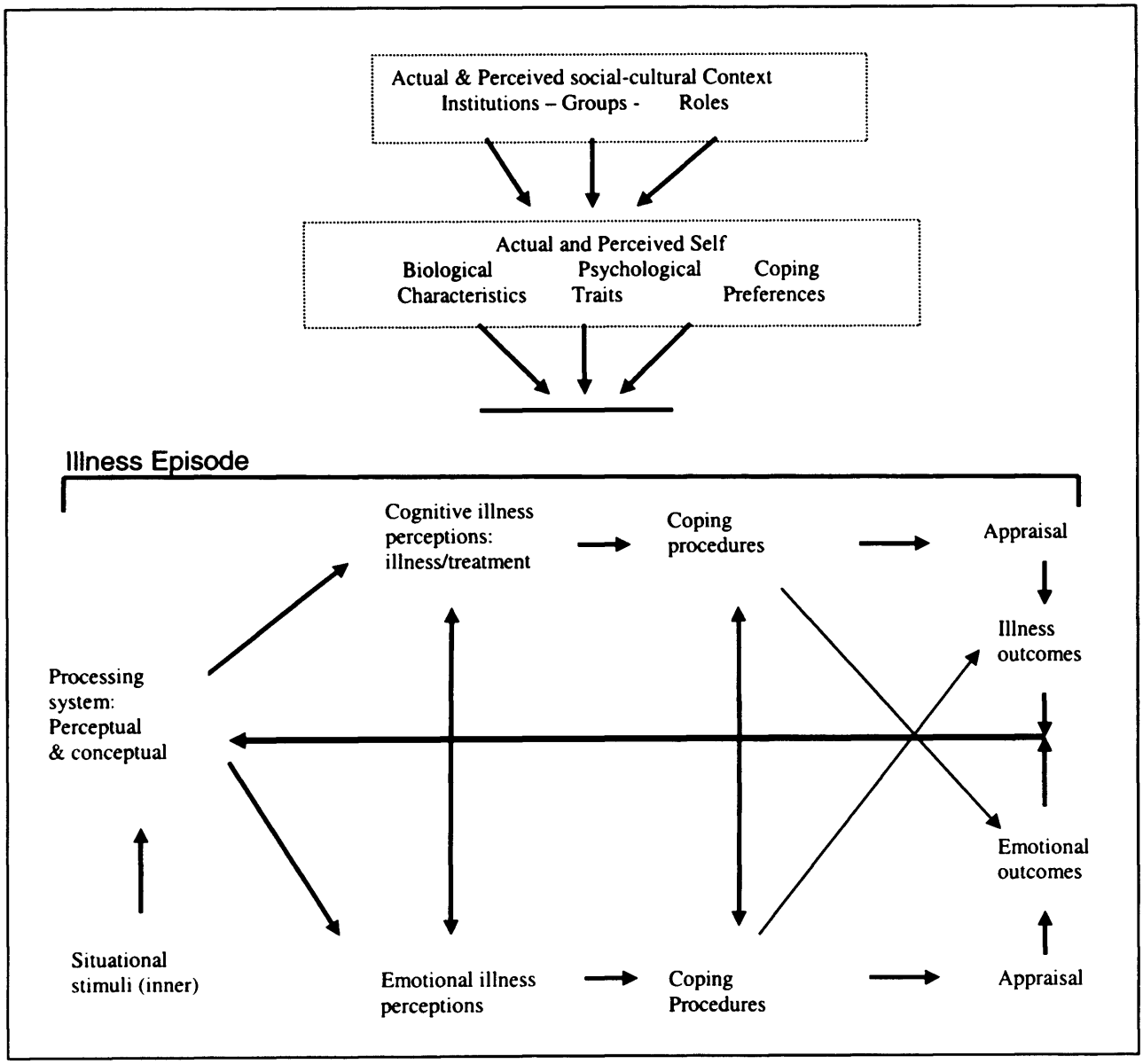
Among these self-regulation models, the CSMI has attracted much attention in the past two decades because of its unique and complementary features. The following section introduces this model.

3.1.1.2. The Common-Sense Model of Illness (CSMI)

Leventhal et al. (1980) first introduced CSMI from their exploratory and empirical studies of hypertension representations and illness threat. This model argues that cognitive processes operate to affect several outcomes, in which Leventhal et al (1980) outline a parallel process approach. They proposed that an individual processes information about the objective qualities of a sensation when he/she perceives it along with dimensions of emotional distress and threat value; because when an individual focuses

on objective sensations, this helps to decrease the stimulus' potential for generating emotional distress (Figure 3.1).

Figure 3.1. The Common-Sense Model of Illness (CSMI)



Fundamentally, individuals form a mental schema in which the information properties of the stimuli are encoded while blocking the emotional information encoding. Therefore, individuals will experience the overall event as less distressing. In addition, this schema will provide useful information about efficient coping options (Leventhal, 1982).

Figure 3.1 depicts illness perceptions/representations, coping procedures and appraisals, along with feedbacks, are the basic attributes of a "test-operate-test-exit" (TOTE) unit in control theory (Carver & Scheier, 1981; 1990). Evidence has shown that these components may be interrelated and less independent of one another. Although

in CSMI, the order of these components is presented as a linear relation, it is not static. When an illness event happens and the information is perceived, the loop of illness perceptions and coping procedures are appraised and feedbacks are given to match the individuals' emotional loop and general perceptions.

3.1.1.3. Illness perceptions

Illness perceptions are one of the key components of CSMI, because the problem-solving episodes are either initiated by somatic sensations or by disease labels. Although other terms have been used to examine illness perceptions (i.e., "*personal model*" or "*personal belief*"), it is generally agreed that illness perceptions contain five domains: identity of illness symptoms; timeline/duration of illness; causes of illness; consequences of illness; and its controllability/cure (Dempsey, Dracup, & Moser, 1995; Lau & Hartmann, 1983):

Identity/labels of illness symptoms: The first thing an individual encounters is the illness symptoms. Symptom identity/label refers to the process of matching somatic sensations of illness to the individuals' underlying schema. When individuals detect certain somatic sensations, they would start to question themselves: "What is going on? Something is not right with me?" These questions will induce individuals to gather information and decide how serious these symptoms could be. The information mainly comes from three sources: (1) past experiences from significant others or the individuals themselves, (2) authoritative information, and (3) individuals' current experiences. Depending on the information, individuals decide whether they should ignore the symptoms, seek for help or take other options. According to Leventhal and colleagues (Leventhal, 1982, 1986; Leventhal & Diefenbach, 1991), the matching process is an integration of current symptoms with the schema of specific illness episodes. Another view suggested the process as matching a set of symptoms to a generalised prototype (Bishop & Converse, 1986). These two views both have had supportive findings. Croyle and Barger (1993) suggested that the former process might be more active when a severe or unusual episode happens and the later process might be more dominant if the somatic sensations more readily match the prototypes.

Illness timeline/duration: Timeline refers to the individuals' beliefs about the course of the illness and time scale of symptoms (Hagger & Orbell, 2003). It also refers to the

duration of a disease, the length of the treatment regimen, the time needed for cure/control, or even the duration from onset to death (Heidrich et al., 1994).

Illness causes: The causes represent the individuals' beliefs of the factors that are responsible for causing the illness. These causes may include environmental, behavioural, psychological or biological causes (De Valle & Norman, 1992; Moscovici, 1986).

Illness consequences: This refers to the individuals' expectations or beliefs of the impacts that may be caused by the illness. These consequences may be physical, social, psychological or financial (Cella et al, 1993; McGee et al., 1991).

Illness control/cure: Illness control/cure refers to the beliefs individuals hold regarding the possibility of successful self-management or expert interventions (Lau & Hartmann, 1983). One should point out that the belief of illness control/cure is different from the concept of "locus of control". Locus of control examines general personal beliefs about external and internal control on one's life. However, the belief of illness control is more specific to illnesses.

All five domains contain specific types of semantic and perceptual information about an illness threat and the information in each domain is both abstract and concrete (Leventhal, 2003). The integration of new information with existing schematic structures will help to develop the breadth of representations, as their content can expand from one to five domains. When somatic stimuli are converted into cognitive representations, a number of rules may be applied: "symmetry rule" (Leventhal et al., 1980), "stress-illness rule", "age-illness rule", "prevalence rule" (Croyle & Jemmott, 1991) and the "duration rule" (Mora et al., 2002). The symmetry rule refers to the pressure of connecting abstract experiences with labels. The stress-illness and age-illness rules help individuals to question whether symptoms or functional changes reflect an underlying disease process or not and whether one is ill. The prevalence and duration rules help individuals to address the potential seriousness of a symptom and whether they should call for care (Leventhal et al., 2003).

Recently, Hagger and Orbell (2003) reviewed illness perceptions across different illnesses and their results further support that the perception of symptoms, illness controllability, illness duration, and the expectation of illness consequences significantly

correlated with respondents' psychological wellbeing, social functioning and vitality. The following sections will review illness perceptions and their correlations with MI.

3.1.2. How are 'illness perceptions' measured?

The development of these five illness perception domains is the accumulation of research findings from qualitative (i.e., open-ended interviews) (Baumann & Leventhal, 1985; Lacroix , 1991; Lau et al, 1989; Lau & Hartmann, 1983; Meyer et al., 1985) and quantitative approaches (e.g., multidimensional scaling and factor analysis) (Bishop & Converse, 1986; Bishop, 1991; Penrod, 1980). In the area of MI, the concepts of illness perceptions have been applied either through qualitative or quantitative approaches. Table 3.1 summarises the main research methods used to examine illness perceptions in MI patients.

Table 3. 1. The qualitative and quantitative methods used for MI and illness perceptions

Domains of illness beliefs	Method	Study
Symptoms	Structured interview - Interview – grounded theory	Horne et al. (2000) Scherck (1997); Brink et al. (2002b); Pattenden et al. (2002)
	Questionnaire - Illness Perception Questionnaire (IPQ, Weinman et al., 1996; Moss-Morris et al., 2002; Broadbent et al., 2006)	Hartford et al. (1993) Petrie & Weinman (1997)
Causes	Interview Questionnaire – IPQ	Mullen (1997) Weinman et al. (1996; 2000); Figueiras & Weinman (2000)
	Network analysis approach Q-sort card	French et al. (2003) Billing (1997ab)
Timeline	Questionnaire – IPQ	Petrie & Weinman (1997); Figueiras & Weinman (2000); Whitmarsh et al. (2003)
Consequences	Interview – Grounded theory Questionnaire - CAS Questionnaire – IPQ	Johnson & Morse (1990) Moser & Dracup (1995) Petrie & Weinman. (1997); Figueiras & Weinman (2000)
Cure/control	Questionnaire – IPQ	Petrie & Weinman (1997); Figueiras & Weinman (2000)

CAS: Control Attitude Scale; IPQ: Illness Perception Questionnaire

3.1.3. What are the relationships between illness perceptions and MI?

Illness perceptions have been used to examine MI patients' treatment-seeking behaviour, adherence (e.g., attending cardiac rehabilitation, changing lifestyles), physical and psychological wellbeing. The following sections will illustrate these studies respectively. Published studies from 1972 onwards were searched (Appendix A-1). As only a few MI studies were found in relation to illness perceptions, other CHD studies that examined illness perceptions were also included.

3.1.3.1. What are the common causes attributed by MI patients?

To present common causal attributions, Table 3.2 summarises eleven studies examining MI patients' causal attributions.

Table 3. 2. A summary of most/least common MI causes reported in past studies

Authors	1st MI or not	Measure	Measuring time/ sample	Three most common causes of MI	3 least common causes of MI
Cameron et al. (2005a)	**Yes**	16-item list adopted from IPQ (Weinman et al., 1996)	T1: hospitalisation T2: before discharge T3: 3-months post-MI T4: 6-months post-MI 65 (72.3% men), age = 54.74 ± 9.44	T1: 'stress or worry' (75% on agree + strongly agree); 'high levels of cholesterol' (59%); 'hereditary – runs in my family' (45%)	T1: 'chance or bad luck' (14%); 'depression' (15%); 'poor medical care in my past' (23%)
French et al. (2005b)	**Yes**	24-item lists (Affleck, 1987ab; De Valle & Norman, 1992)	Hospitalisation 155	'Stress/worry'; 'smoking'; 'cholesterol'	
French et al. (2005c)	**Yes**	interview	Hospitalisation 12	'Stress'; 'heredity'; 'behaviours' (smoking, diet, exercise)	
Gudmundsdottir et al. (2001)	**Yes**	5 different methods – a. spontaneous attributions; b. elicited attributions; c. cued attributions; d. most important attributions; e. attribution categories	T1: after discharge T2: 2-months post-MI T3: 6-months post-MI T4: 12-months post-MI 100 MI (65% men), age = 56.03 ± 6.5	T1 only – a. smoking; exercise; overwork b. smoking; stress; overwork c. stress; smoking; myself d. smoking; stress; worry e. 1. behavioural self-blame (for methods a, b, & c); 2. self-blame (for a); 2. biology (for b); 2. characterological self-blame (for c); 3. characterological self-blame (for a); 3. circumstances (for b); 3. chance (for c)	T1 only – a. stress at work; drinking alcohol; stress b. arguing with people; depression; nerves c. payment for sin; punishment for doing wrong; by the way other people treat me
Jacobsen & Lowery (1992b)	**Yes**	Interview: "With regard to your heart attack, have you ever asked 'Why me?'" if yes, "How have you answered the question?"	T1: 72 hours post-MI T2: 3-5 months post-MI 42 patients (55% men)	Both at T1 & T2: 'don't know' (52.5%); 'fate' (20%); 'personal habits' (12.5%)	
Koslowsky et al. (1978)	**Yes**	16 causes (factor analysis resulted in 5 components: tension, physical, supernatural, family & other)	(T1: before discharge) T2: 1 month after discharge (T3: 1 year) 345 men	Being under tension at work (64.9%); nerves (60%); worry (59.7%)	Punishment for doing wrong in life (11.9%); problems with wife (17.1%); drinking (17.9%)
Petrie & Weinman (1997)	**Yes**	24-item list (Affleck, 1987ab; De Valle & Norman, 1992)	T1: in hospital, 143 patients (T2: 3-months post-MI) (T3: 6-months post-MI) (T4: 12-months post-MI)	T1: stress; cholesterol; fatty food	
Zerwic et al. (1997)	**Yes**	Interview with open-ended questions about general causes and personal causes	Hospitalisation 65 patients (74% men) age = 57.2 ± 12.7	General causes – 'diet/cholesterol' (75%), 'smoking' (54%); 'family history' (32%) Personal causes – 'diet' (45%); 'smoking' (32%); 'stress' (23%)	General causes – 'unsure' (6%); 'overexertion' (7%); 'other' (17%) Personal causes – 'obesity' (6%); 'medical disease' (9%); 'overexertion' (9%)
Croog & Richards (1977)	Mixed	19-item list	T1: before discharge T2: 1 month – 345 patients T3: 1 year – 293 patients T4: 7-8 years – 205 patients	T1: unknown T2-T4: 'smoking', 'being under tension at work' & 'nerves' were the three most common causes (order changed slightly every time)	
Fukuoka et al. (2004)	Mixed	2 open-ended questions – "What do you think caused your heart attack?" "Please list 3 possible causes of your heart attack from most to least likely"	3.6 ± 1.7 days hospitalisation 155 Japanese patients (86.5% men) mean age = 62	'Smoking' (18.7%); 'stress' (15.5%); 'diet' (13.5%)	All (0.6%) – drank too much alcohol, not taking medicine regularly; personality; physically weak; unlucky all my life; atherosclerosis;
Murphy et al. (2005)	45% had MI, 55% had CAGB	2 types of causal attributions questions – 1. at T1: regarding heart disease in general – 2 open-ended questions: "Before you had your recent heart problem, did you have any ideas about why people had heart problems"? "Is there anything else?" 2. From T1-T3: causes regarding their own heart disease: "Why do you think you had these heart problems?", "Did anything else contribute to your heart problems?"	T1: in hospital - 260 women (age = 68.6 ± 10.4) T2: 4-month post-MI T3: 12-months post-MI	CHD causes in general – current smoking (32%); stress (19%); no ideas (18%) CHD causes for their own – Current smoking (44%); Family history (40%); diabetes (22%)	

Three out of the eleven reviewed studies measured both first-time MI and those with previous MI patients (Croog & Richards, 1977; Fukuoka et al., 2004; Murphy et al., 2005). The results indicated that during hospitalisation, no matter whether the respondents were experiencing their first MI or not, or what measurement tools were used, the most common causes were 'stress/worries', 'high cholesterol', 'diet (eating fatty food)', 'smoking' and 'heredity'. The least mentioned causes included 'chance or

bad luck', 'depression', poor medical care in the past', 'drinking', 'punishment', and 'problems with their wife'.

Only two of the eleven studies measured causal attributions after patients' hospital discharge. However, findings from the two studies could not offer a clear conclusion, as in Jacobsen's study (1992b), after 3-5 months post-MI, over 50% of the patients did not know the causes and 20% attributed their MI to 'fate'. However, findings by Croog and Richards (1977) were in line with those studies conducted during patients' hospitalisation, as 'smoking' and 'tension' were the most cited causes. As Jacobsen and Lowery (1992b) only examined 42 patients, the results might be less representative than that of Croog and Richards (1977). It is of note that three of the reviewed studies recruited less than 100 participants (Cameron et al., 2005a; Jacobsen and Lowery, 1992b; Zerwic et al., 1997) and therefore their findings are likely to be underpowered. It is also important that first-time MI patients' causal attributions may be different from those who had experienced an MI before. Unfortunately, none of the three studies that used both first-time MI patients and patients with previous MI compared these two groups (Croog & Richards, 1977; Fukuoka et al., 2004; Murphy et al., 2005). In addition, none of these studies examined whether gender influenced causal attributions.

3.1.3.2. Illness perceptions and MI treatment-seeking behaviour

Most of the studies related to MI patients' treatment-seeking behaviour focus on how long it took for people to go to see doctors after their symptoms started, and what might influence this decision-making process (Carney, et al., 2002; Horne, et al., 2000; Martin & Lemos, 2002; Pattenden et al., 2002; Scherck, 1997; Schoenberg et al., 2003; Walsh et al., 2004). Six studies that examined MI patients' pre-MI illness perceptions and treatment-seeking behaviour are summarised in Table 3.3.

Table 3. 3. Illness perceptions and MI treatment-seeking behaviour

Illness perception components	Research methods/measure	Authors	Assessment time/subjects	1st MI or not	Findings
Perceived symptoms	Qualitative: grounded theory	Brink et al. (2002b)	4-6 days in hospital 22 (11 men, 11 women)	**Yes**	Individuals who were aware of risks for coronary heart disease & who understood the seriousness of the symptoms were ready to act and seek care
	Interview	Horne et al. (2000)	During hospitalisation 88 (age = 61 ± 9.8)	**Yes**	The mismatch between patients' expected and experienced symptoms was related to their delay of seeking help (Ps. 58% of patients had mismatched symptoms)
	Interview	Bunde & Martin (2006)	8.5 (± 6.16) days post-MI 433 (307 men, 126 women) mean age = 59.85 ± 11.87	Mixed	Those experienced mild, gastrointestinal distress, or no sweating delayed to seek care
		Carney et al. (2002)	3-6 days post-MI 62 (age = 57.03 ± 10.75)	Mixed	Those labelled their symptoms related to heart attack went to the hospital quicker (p = 0.047)
	Interview & questionnaire	O'Carroll et al. (2001)	3-5 days post-MI 72 (22% had previous MI)	Mixed	Those who think their symptoms were related to heart attack did not go to the hospital quicker than those didn't think so (Ps. Health locus of control – by chance was the only predictor of help-seeking)
Causal attributions	Interview	Bunde & Martin (2006)	8.5 (± 6.16) days post-MI 433 (307 men, 126 women)	Mixed	Those attributed their symptoms to non-cardiac delayed seeking care
Consequences	Questionnaire (IPQ)	Walsh et al. (2004)	2-4 days post-MI 61 (age = 62 ± 10.5)	Mixed	Those who believed the consequences of pain were serious had shorter delay times (r = -0.50, p < 0.01). The other 4 illness beliefs (symptom identity, timeline, cure/control and cause) did not predict help seeking behaviour

All of these studies were carried out during patients' hospitalisation. Two of the studies measured first-time MI patients (Brink et al., 2002b; Horne et al., 2000). Overall, MI patients' explanations of their symptoms and the severity level of symptoms were highly correlated with their decision to seek treatment. Those who had severe pain and those who linked the pain with a heart attack tended to make a quicker decision to visit doctors. These studies also showed that whether the patients were experiencing their first-time MI did not influence the delay in seeing medical help. Only one study recruited more than one hundred participants (Bunde & Martin, 2006).

3.1.3.3. Illness perceptions and MI treatment adherence

Treatment adherence includes attending cardiac rehabilitation, changing lifestyles and adhering to medical treatment. Only five studies have examined the relationship between illness perceptions and adherence to MI treatment. These are shown in Table 3.4.

Table 3. 4. Illness perceptions and MI treatment adherence

Illness perception components	Research methods	Authors	Samples/ 1st MI or not	Measure time	Findings related attending cardiac rehabilitation (with control variables or not)
Perceived symptoms	IPQ (1996)	1. Whitmarsh et al. (2003)	93 (71 men), mixed MI	post discharge/ 6-months post-MI	Fewer symptoms independently predicted poor/non-attendance (control variables: maladaptive coping, problem-focused coping, cure/control)
Causal attributions	IPQ (1996)	1. Whitmarsh et al. (2003)	1. 93 (71 men), mixed MI	1. T1. post discharge T2. 6-months post-MI	1.Those had a stronger belief in 'virus' cause at T1 tended to be poor/non-attendant at T2 (no control variables)
		2. Cooper et al. (1999)	2. 137 mixed CHD	2. T1. before discharge T2.6-months pos-MI	2.Those with weaker belief in 'lifestyle cause' at T1 was positively related to T2 non-attendance (no control variables)
		3. French et al. (2005a)	3.194 mixed MI (81.4% first MI)	3. T1. 24 hours hospitalisation T2. 6-months post-MI	3.all T1 individual causes did not correlate or predict T2 attendance (age, employment, smoking)
	Interview	Murphy et al. (2005)	T1: 260 women (age = 68.6 ± 10.4) (45% MI)	T1: in hospital; T2: 4 month; T3: 12-months post-MI	causal attributions did not predict or distinguish rehabilitation attendance (no control variable)
Timeline	IPQ (1996)	French et al. (2005a)	194 mixed MI (81.4% 1st MI)	T1. 24 hours hospitalisation T2. 6-months post-MI	T1 timeline did not correlate or predict T2 attendance (no control variables)
Control/cure	IQP (1996)	1. Whitmarsh et al. (2003)	1. 93 (76.3% men), mixed MI	1. T1. post discharge T2. 6-months post-MI	1.T1 Less belief in cure/control independently predicted T2 poor/non-attendance (control variables: maladaptive coping, problem-focused coping, symptom identity)
		2. Cooper et al. (1999)	2.137 mixed CHD	2. T1. before discharge T2. 6-months post-MI	2.T1 weaker in 'cure/control/ was positively correlated with T2 non-attendance (no control variables)
		3. Petrie & Weinman (1997)	**3.143 first MI**	3. T1. before discharge T2. 6-months post-MI	3.T1 weaker 'cure/control' was related to T2 non attendance (no control variables)
		4. French et al. (2005a)	4. 194 mixed MI (81.4%1st MI)	4. T1. 24 hours hospitalisation T2. 6-months post-MI	4. T1 cure/control did not correlate or predict T2 attendance (no control variables)
Consequences	IPQ (1996)	1.Cooper et al. (1999)	1.137 mixed CHD	1. T1. before discharge T2. 6-months post-MI	1.T1 belief in less serious consequences was positively related to T2 non-attendance (no control variables)
		2.Petrie & Weinman (1997)	**2.143 first MI**	2. T1. before discharge T2. 6-months post-MI	2.T1 less serious consequence belief was related to T2 non attendance (no control variables)
		3. French et al. (2005a)	3. 194 mixed MI (81.4% 1st MI)	3. T1. 24 hours hospitalisation T2. 6-months post-MI	3. T1 consequence belief did not correlate or predict T2 attendance (no control variables)

IPQ: Illness Perception Questionnaire

Overall, only one study exclusively measured first-time MI patients (Petrie & Weinman, 1997). Sixty percent of the reviewed studies (Cooper et al., 1999; Petrie & Weinman, 1997; Whitmarsh et al., 2003) showed stronger relationships between illness perceptions and attending rehabilitation. Further support came from the study of Petrie and Weinman (1997) with first-time MI patients, which revealed that less cure/control and less serious consequences of the MI would result in not attending cardiac rehabilitation.

Two studies reported no positive correlation between illness perceptions and cardiac rehabilitation attendance (French et al., 2005a; Murphy et al., 2005), however, it is of interest that these two studies recruited both first-time MI patients and those with more than one MI experience. It is not known whether first-time MI patients would differ from those with previous MI experiences as no comparisons were conducted on these two groups in these studies. In addition, as Murphy et al. (2005) did not include male

patients or report how many of their participants suffered a first-time MI, one may question whether these variables would contribute to their findings. All but two studies (French et al., 2005a; Whitmarsh et al., 2003) used univariate analysis (comparison). Therefore, one could not really conclude whether illness perception was an independent predictor of treatment adherence.

3.1.3.4. Illness perceptions and physical functioning of MI patients

Table 3.5 summarises five studies measuring MI patients' illness perceptions and physical progresses/outcomes.

Table 3. 5. Illness perceptions and MI patients' physical functioning

Illness perception components	Research methods	Authors	Sample	Measuring times	Results
Causal attributions	1. One question: Why did it happen to me?	1.Gilutz et al. (1991)	185 (mixed MI)	T1. In hospital T2. 6-months post-MI	T2 hospital visits and re-occurrence did not significantly correlate with T1 external, internal or medical/genetic causes
	2. One question asking about 'stress causes'	**2.Soejima et al. (1999)**	**111 men (First MI) age: 54.3 ± 7.1**	T1. In hospital T2. 8-months post-MI	T2 delay in returning to work was related to a failure to recognise a link between stress, (coping style) and illness (p = 0.001) at T1
	3. 13-items combined into 5 factors – personal behaviour, stress responses, blaming other people, bad luck, heredity	**Affleck et al. (1987ab)**	**T1: 287 men (First MI) T2: 205**	T1. 7-weeks post-MI T2. 8-years post-MI	T2 heart recurrence - T1 'blaming others' predicted T2 recurrence independently T2 morbidity – T1 'stress' predicted T2 morbidity independently
Consequences	1.One question about returning to work & work activity level	**Soejima et al. (1999)**	**111 men (First MI) Age: 54.3 ± 7.1**	T1. In hospital T2. 8-months post-MI	T2 resuming work at a lower activity level - was related to T1 patients' illness perceptions and prediction of their lower work activity (p = 0.001)
	2. one question to measure 'perceived gains' – Despite all the problems and worries which your illness has involved, do you see any possible benefits, gains or advantages in this experience? If so, what are they?	**Affleck et al. (1987ab)**	**T1: 287 men (First MI) T2: 205**	T1. 7-weeks post-MI T2. 8-years post-MI	T1 'perceived gains' predicted T2 recurrence and morbidity - Those agreed they gained something from the MI event had less recurrence and morbidity
	3. IPQ (1996)	**Petrie & Weinman (1997)**	**143 first MI**	T1. Before discharge T2. 6-months post-MI	T2 functional disability (Sick Impact Profile, SIP, Bergner, 1981) – patients with serious consequence perceptions at T1 had worse functional disability at T2
Overall illness perception	IPQ (1996) - total scores represent more negative perceptions	Cherrington et al. (2004)	49 (49% men) age = 60.8 ± 13.32	1-2 days in hospital	In-hospital complications (measured by chart audit) - Negative illness perceptions predicted same time occurrence of illness complications after controlling moods. Ps. depression & anxiety did not mediate illness perceptions and complications. Negative illness perceptions positively correlated with depression and anxiety

IPQ: Illness Perception Questionnaire

These five studies only measured causal attributions and illness consequences. Four supported significant correlations between causal attributions/illness consequences with physical wellbeing. The remaining four studies showed that, those who believed in serious consequences tended to return to lower work activity levels or had a worse functional disability, but those with a positive attitude toward MI consequences had lower morbidity and recurrence (Cherrington et al., 2004).

'Stress causes' positively correlated with returning to work. Three studies that only recruited first-time MI patients also reflected similar findings with other studies that those MI patients with negative illness perceptions tended to have a worse recovery.

3.1.3.5. Illness perceptions and psychosocial wellbeing of MI patients

To examine whether illness perceptions significantly correlate with post-MI psychological wellbeing, Table 3.6 summarises eight studies that examined four components of illness perceptions (illness symptoms, causes, timeline, consequences) and their relationships with MI patients' psychological wellbeing.

Table 3. 6. Illness perceptions and MI patients' psychosocial wellbeing

Illness perception components	Research methods	Authors	Sample	Measuring times	Results
Perceived symptoms	IPQ (1996)	**Petrie & Weinman (1997)**	**143 first MI**	T1. 3-months post-MI; T2. 6-months post-MI	T2 sexual dysfunction (Stewart & Ware, 1992) – serious symptom identity was positive with sexual dysfunction
	PSS (Webster, 1983)	Chiou et al. (1997)	40 MI	hospitalisation	In-hospital depression and anxiety (HAD) – those perceived their MI as more severe showed a higher level of anxiety, but not depression.
Causal attributions	1.interview	1.Gilutz et al. (1991)	185	T1. hospitalisation T2. 6-months post-MI	T2 6-month subjective health was positively correlated withT1 internal causes (limits & strengths), but negatively correlated with T1 external causes (fate & luck)
	IPQ (1996)	**1. Weinman et al. (2000) & French et al. (2005b)**	**T1: 143 first MI; Age = 53.2 ± 8.4 T2: 115 Re-analyse the same data set**	T1. hospitalisation; T2. 6-months post-MI	T1 perceived health – the numbers of T1 causal attributions negatively correlated with perceived health ($r = -0.34$, $p < 0.001$) T2 health behaviour change – T1 lifestyle causes could predict T2 changes of dietary behaviour (T1 spouses' lifestyle causes could predict T2 patients' exercise behaviour) After control pre-MI behaviour, French (2005b) found patients' causal attributions did not predict T2 behaviour change
		2. French et al. (2005b)	T1: 155 T2: 132	T1. hospitalisation T2. 6-months post-MI	Before controlling pre-MI behaviour, T1 lifestyle causes predicted T2 exercise behaviour. But after controlling pre-MI behaviour, none of patients' causal attributions predicted behaviour changes
		3.French et al. (2005a)	194 mixed MI (158 1stMI)	T1. 24 hours hospitalisation T2. 6-months post-MI	T2 quality of life for MI (QLMI, Lim et al., 1993) – T1 'stress', 'other people', & 'state of mind' predicted T2 emotional/physical/social QLMI
	Interview: 'Why me?'	**Jacobsen & Lowery (1992b)**	**42 first-MI**	T1. 72 hours post-MI T2. 3-5 months post-MI	T2 anxiety, depression & hostility (Multiple Affect Adjective Checklist, Zuckerman & Lubin, 1965) Those questioned 'why me?' at T1 were more anxious than those not questioned ($p = 0.01$) at T2.
		Lowery et al. (1992)	**152 first-MI**	Hospitalisation (after 3 days post-MI)	Those who asked themselves this question and tried to find an answer were more anxious than those not asked this question.
Timeline	IPQ (1996)	**Petrie & Weinman (1997)**	**143 first MI**	T1. Before discharge T2. 6-weeks post-MI	T2. return to work - those returned to work before 6 weeks post-MI had a stronger belief in short illness timeline
Consequences	IPQ (1996)	French et al. (2005a)	194 mixed MI (158 1stMI)	T1. 24 hours hospitalisation T2. 6-months post-MI	T2 quality of life for MI (QLMI, Lim et al., 1993) – T1 consequence perceptions predicted T2 emotional/physical/social QLMI
	IPQ (1996)	**Petrie & Weinman (1997)**	**143 first MI**	T1. Before discharge T2. 6-months post-MI	T2 functionally disability (Sick Impact Profile, SIP, Bergner et al., 1981) – disability was positively correlated to serious consequence belief

IPQ: Illness Perception Questionnaire; PSS: Perceived Severity Scale

Of the two studies examining illness symptoms and psychosocial wellbeing, one was cross-sectional with mixed MI patients (Chiou et al., 1997) and the other was longitudinal with only first-time MI patients (Petrie & Weinman, 1997). Both studies supported the findings that more perceived symptoms correlated with patients' worse psychological wellbeing, i.e., 6-month sexual dysfunction (Petrie & Weinman, 1997) and in-hospital anxiety (Chiou et al., 1997). However, one should be aware that Chiou et al. (1997) only recruited 40 MI patients.

Petrie & Weinman (1997) also reported that first-time MI patients with longer timeline and serious consequence perceptions tended to delay return to work and had worse functional disability, respectively. Their finding of worse illness consequences and functional disability was in accordance with French et al. (2005a).

Four studies reported significant correlations between causal attributions and psychosocial progress. For example, those who attributed their MI to controllable causes reported better subjective health in six months, but those who attributed uncontrollable/external causes had the opposite results (Gilutz et al., 1991). Causes related to 'stress', 'other people' and 'state of mind' were found to be significant predictors of MI patients' quality of life (French et al., 2005a).

Although Weinman et al. (2000) reported that 'lifestyle causes' significantly correlated with MI patients' 6-month dietary behaviour changes, they did not control for patients' baseline dietary behaviour. After controlling pre-MI dietary behaviour, French et al. (2005b) reported it did not predict the change of dietary behaviour. These two studies highlight the importance of accounting for possible confounding variables in order not to be misled by biased results.

Another interesting finding was from Jacobsen et al. (1992b) and Lowery et al. (1992). Both studies found that MI patients who asked themselves the question "Why me?" showed a higher level of anxiety either at the same time (hospitalisation) or 3-5 months later than those who did not ask themselves this question. It was possible that even these patients tried to find possible causes without a success, and this kind of confusion or unclear answers might make them more anxious than those who did not ask the same question.

3.1.4. How stable are illness perceptions over time?

Only five studies have examined the stability of illness perceptions among MI patients (Table 3.7).

Table 3. 7. Stability of illness perceptions related to MI

Illness belief components	Research methods/measure	First author	Subjects	Measure points	Stability
Causal attributions	Interview with open-ended questions	Murphy et al. (2005)	45% had MI, 55% had CAGS T1: 260 women (age = 68.6 ± 10.4)	T1: in hospital; T2: 4 month; T3: 12 months	No significant change over time. Women's awareness of their risk factors remained low
	Likert-scale questions for 16 items	**Cameron et al. (2005a)**	**T1 & T2: 63; T3: 56, T4: 51** **First MI**	T1: 1-2 days hospitalisation; T2: before discharge; T3: e months; T4: 6 months	The top five most common causes (stress/sorry, high cholesterol, heredity, fatty foods, high BP) were stable from T1 to T4
	Open-end questions and lists – a. spontaneous attributions; b. elicited attributions; c. cued attributions; d. most important attributions	Gudmundsdottir et al. (2001)	100 MI age < 70 (65 men) age = 56.03 ± 6.5	T1: after discharge T2: 2 months T3: 6 months T4: 12 months	T1 to T4 by different methods – a. spontaneous – 'smoking' remained stable from T1-T4; 'exertion' decreased from T1 to T2 & then remained stable (p = 0.02); 'overwork 'remained stable over time b. elicited – 'smoking' decreased from T1 to T3 & then increased sharply at T4 (p = 0.03); 'stress' continued to increase (p = 0.02); 'overwork' decreased from T1 to T2 & then became stable (p = 0.02) c. cued – 'stress' & 'smoking' remained stable; 'myself' decreased significantly from T1 to T4 (p = 0.001)
	Illness Perception Questionnaire (1996)	Weinman et al. (1996, 1997)	T1: 143 T2: 104 T3: 91	T1: 2-5 days in hospital T2: 3 months T3: 6 months	No significant change over time on three causal components (stress, heredity, lifestyle)
Other illness perceptions	Illness Perception Questionnaire (1996)	Weinman et al. (1996, 1997)	T1: 143 T2: 104 T3: 91	T1: 2-5 days in hospital T2: 3 months T3: 6 months	1. timeline: significantly increased 2. symptom identity: remained stable 3. cure/control: decreased significantly 4. consequences: remained stable

Of these studies, Cameron et al. (2005a) recruited less than 100 patients. In-hospital illness perceptions were longitudinally examined in all studies for 12 months. These studies showed that causal attributions were stable over the first 12-months post-MI. In addition, first-time MI patients seemed to be similar to those with previous MI experiences in terms of the stability of their causal perceptions. The findings from Weinman et al. (1996) showed that MI patients' perceptions of timeline increased over time and cure/control perception decreased. However, the perceptions of symptoms and illness consequences seemed to remain stable.

In terms of the relationship between MI and illness perceptions, Affleck et al. (1987ab), Petrie & Weinman (1997), and Soejima et al. (1999) all followed more than 110 first-time MI patients for at least 6 months (Petrie & Weinman, 1997) up to 8 years (Affleck et al., 1987ab). French et al. (2005b) also conducted a study to examine the relationship between illness perceptions and 155 first-time MI patients' health behaviour change and quality of life during the first six months following the MI. This longitudinal design also controlled for pre-MI health behaviour and quality of life.

3.2. Social support

3.2.1. The social support research history

"Social support" is an omnibus term (Sarason et al., 1990) and it commonly implies an abstract characteristic of persons, relationships, behaviours, or social systems, which may influence health and wellbeing (Cohen et al., 2000; Veiel & Baumann, 1992). Although many researchers have tried to define social support, so far there is no definition that is accepted by all researchers. However, from the recipient's point of view, one can describe social support as a process of receiving perceived *comfort, assistance, and/or information through formal or informal contacts with individuals or groups* (Wallston et al., 1983).

The roots of interest in social support reach back to almost a century ago in sociological studies of "social ties" (the connections between persons, family, community, or work), in which Durkheim (1951) first mentioned that suicides were more prevalent among those with fewer social ties.

In the 1970s and 1980s, interest in the relationship between health and social ties was rekindled and the foundation concepts of social support were laid by the work of three researchers. John Cassel (1974ab, 1976) argued that social support plays a key role in stress-related disorders in humans and animals, and the disruption of significant social ties may reduce resistance to disease. He suggested that support is provided by those who are most important to individuals and it serves as a protective function to "buffer" the individual from bad consequences of stressful experiences. His advocacy that mobilisation of social support is better intervention than attempting to reduce environmental stressors has been the focus of interest in social support.

Gerald Caplan (1974) also agreed on others' potential influences on the outcomes of crises experienced by individuals and elaborated on the kind of help social support may provide. He suggested three main sets of activities of social support: helping to manage emotional problems; sharing demanding tasks; and providing help in dealing with specific stressors (Vaux, 1988).

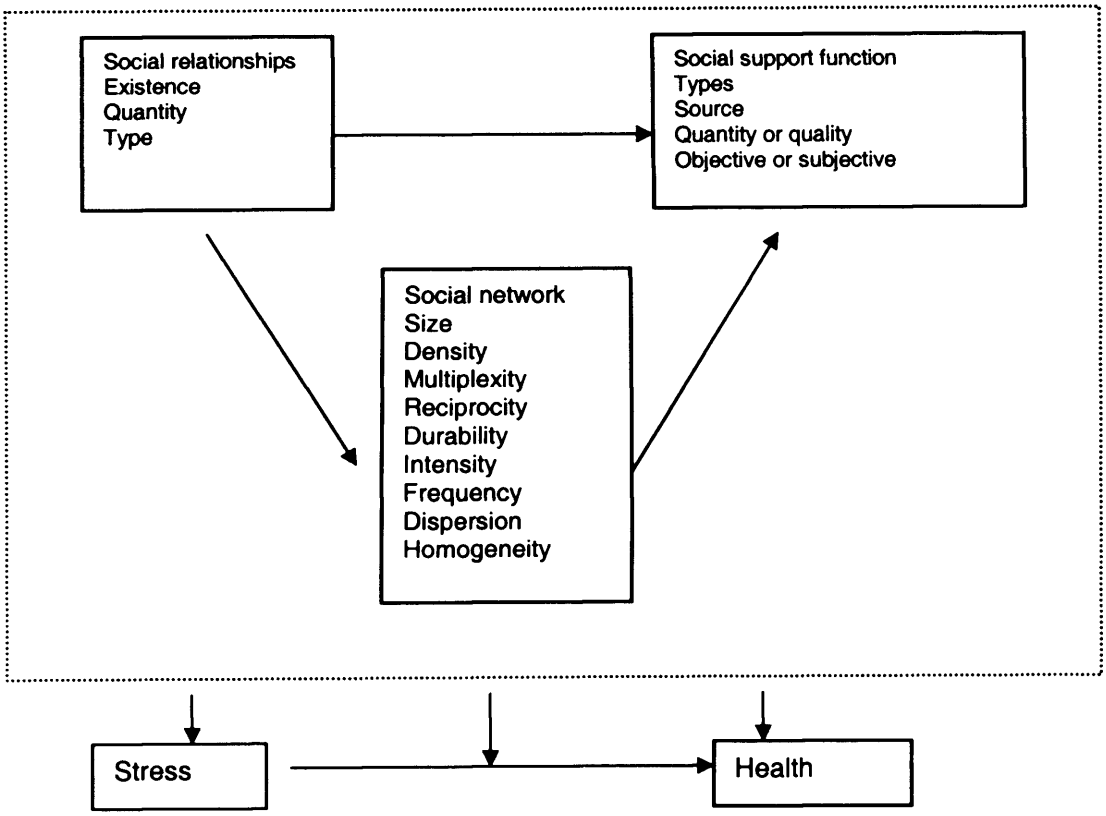
Sidney Cobb (1976) also emphasised support as a stress-buffer and that adequate support can protect people from physical and psychological disorders when facing crises. He proposed viewing support as information leading to three outcomes: the

feelings of being cared for; the belief that one is loved, esteemed, and valued; and the sense of belonging to a network of communication and mutual obligation (Sarason et al., 1990).

3.2.2. The domain of social support

As one can see, social support is a complicated concept. Conceptually or operationally, it can refer to social relationships, structure of relationships (i.e. social network), or functions of relationships (Figure 3.2).

Figure 3. 2. The domain of social support (Modified from House et al., 1985)



Social relationships focus on individual interactions, and marital relationship is the most frequently mentioned relationship. Social relationships also include family, friends, and interactions in employment situations. Social networks focus on the structures of social relationships including size and density of the network. Finally, the support function focuses its influence on health. The benefits of support include the provision of informational, emotional, and instrumental support, such as providing money and time to individuals.

Although social support is important, it may not be always helpful. Unwanted support or support provided in an inappropriate way does not bring positive results to the recipients. Actual (or objective) support does not guarantee help. What really help recipients is the perceived support and whether the recipients feel this is available if it is in need. If perceived available support matches desired support, this may maximise its positive influence. However, if perceived support is inadequate or overwhelming, its positive influence on health will be in doubt.

3.2.3. How is social support measured?

Interviews, open-ended questions and questionnaires are common methods of measuring social support. Table 3.8 lists the most often used questionnaires.

As House et al. (1985) suggested, when examining social support, it is important to consider three aspects such as – quantity, structure, and function. In summary, these social support scales measure structural support, functional support and their availability, adequacy and satisfaction.

Table 3. 8. A summary of popular social support scales

Authors	Social support measures	Contents/dimensions of social support
Barrera et al. (1981) Finch et al. (1997)	The Inventory of Socially Supportive Behaviours (ISSB)	40 items, 5-point scale, rating the frequency of receiving various forms of support 4 basic components: directive guidance, nondirective support, positive social interaction, tangible assistance
Berkman & Syme (1979)	Social Network Index (SNI)	Measuring network size, frequency of visual and non-visual contact, geographic proximity of close relatives and friends, marital status, religious and group membership.
Blumenthal et al. (1987)	Blumenthal Social Support Scale (BSSS)	24 items, 5-point (1-5) to measure respondent's perceptions of available support from special one, family and friends
Boersma et al. (2000)	Multi-dimensional Support Questionnaire for Heart Patients (MSQ-H)	5 dimensions with total 10 items tangible/instrumental support, emotional support, support with respect to lifestyle modification, support concerning heart problems, support regarding self-esteem/identity
Broadhead et al. (1988)	Duke-UNC Functional Social Support Questionnaire	A multi-dimensional, functional social support questionnaire There are two factors comprised of 8 items: 1. Affective support is measured by 3 items 2. Confidant support is measured by 5 items 3. 3 remaining single items measuring visits, instrumental support, and praise
Cohen & Hoberman (1983)	Interpersonal Support Evaluation List (ISEL)	40 items comprising four subscales: tangible support, belonging support, self-esteem support, and appraisal support. Items contain first-person statements that reflect aspects of social support domains (Ps. Another short version was published in 1985 for 30 items)
Cooke et al. (1982)	Social Support Inventory	Consisting of 55 items which measure emotional, esteem, network, appraisal, and altruistic support
Dunkel-Schetter et al. (1986)	UCLA Social Support Inventory	Measuring emotional & informational support desired, received, sought, and reciprocated from the spouse, another family member, and a friend
Henderson et al. (1980)	Interview Schedule of Social interaction (ISSI)	32 items measuring 4 support dimensions: availability of social integration & attachment, adequacy of social integration and attachment
Glass et al. (1997)	Social Network Questionnaire (SNQ)	Assessing both structural and functional support
Joseph et al. (1992)	Crisis support scale (CSS)	7 items measuring 7 aspect of support – 1. availability of someone listening when needed 2. contact with people in similar situations 3. the ability to express oneself 4. emotional support 5. practical support 6. the experience of being let down 7. general satisfaction with support
Landerman et al. (1989)	Duke social support index	social network and the support provided by that network 35 interview items including at least 4 dimensions of social support: satisfaction with social support (4-item), perceived social support (7-item), frequency of social interaction (4item), size of the social network (4-item), instrumental support (13 items)
McFarlane et al. (1980)	The Social Relationship Scale	7-point self-reported scale Six categories measuring: (1). life stress, (2). network, (3). helpfulness
Mitchell et al. (2003)	The ENRICHD social support inventory	7 items, self-rated scale range from 1 -5, with item 7 scores 4 = yes & 2 = no measuring structural (partner), instrumental (tangible support) and emotional (caring) support
Norbeck (1984)	Norbeck Social Support Questionnaire (NSSQ)	self-rated for 9 categories of support sources Measures multiple dimensions of social support, including 1. 3 functional properties--affect, affirmation, and aid 2. Support network: size, stability (duration of relationships), & accessibility (frequency of contact) 3. The changes in the convoy or support system due to losses of relationships
Procidano & Heller (1983)	Perceived Social Support (PSS) from Friends and Family Scales	Containing 20 self-report 'Yes = 1' & 'No or do not know = 0' items, assessing perceived social support from friends and 20 items assessing perceived social support from family.
Sarason et al. (1983)	Social support questionnaire (SSQ)	27 items, self-report, 6-point scale (1-6) measure both the amount of support (available number of support providers) and satisfaction with perceived support on six circumstances (There is also a 6-item brief version)
Zimet et al. (1988)	Multi-dimensional Scale of Perceived Social Support (MSPSS)	12 items with 7-point to measure respondent's perceptions of available support from special one, family and friends. (This is a brief version of BSSS)

3.2.4. What is the relationship between social support and MI?

Research in social support and MI has attracted much attention in past decades. To understand the influences of social support on MI, three sections are devoted to the examination of support and MI: physical progress/outcomes, psychosocial progress/outcomes, and stability of support. A search was conducted on studies published between 1972 and 2007 that examined social support and MI. Studies that recruited MI and other types of CHD patients together were excluded. (Appendix A-1)

3.2.4.1. Social support and post-MI mortality and morbidity

As only one study used a cross-sectional design, it was reviewed together with longitudinal studies (Table 3.9).

Of the nineteen studies, five recruited first-time MI patients. Four of these five studies supported the positive relationships between social support and physical outcomes (e.g. cardiac events, subjective health and mortality). The only study that reported negative results was from Beach et al (1992), who showed that spouses' support did not have a positive correlation with patients' physical recovery.

Three out of the remaining fourteen studies also did not show that social support had a positive role in cardiac events (Frasure-Smith et al., 1995a) and mortality (Frasure-smith et al., 2003; Thomas et al., 1997). Another two studies partially failed to support long-term mortality (Greenwood et al., 1995) and cardiac function (Rankin, 2002).

Except for the above studies, all the remaining studies had supportive findings in the positive relationships between social networks or perceived support with physical outcomes.

However, one should bear in mind that some of the studies might suffer some limitations. For example, Helgeson (1991), Rankin (2002), Beach et al. (1992) and Winfield (1982) all recruited less than 100 patients. Several studies only conducted bivariate correlational analysis (Ell & Haywood, 1984; Helgeson, 1991; Jenkinson et al., 1993). Others did not describe whether other possible confounding variables were controlled for in the multivariate analyses (Case et al., 1992). Another issue was related to time of assessment. Only four studies (Helgeson, 1991; Pedersen et al., 2004; Ruberman et al., 1984; Welin et al., 2000) measured social support after hospital discharge. Others measured baseline perceived support during patients' hospitalisation. When patients are hospitalised, they may expect to get more support by others surrounding them (including family, friends, and healthcare professionals), and they may also have different levels of support expectations, it may not be a proper time to measure social support.

Table 3. 9. Social support and MI patients' mortality and morbidity

Authors	1st MI or not	Sample	Social support measure/cut-off	Measure times	Results
Dickens et al. (2005)	Mixed	314 (63.4% men) Age = 57.6 ± 11.2	Having a close confidant or not ; Frequency of social contacts	In-hospital	Killip class 2 or 3 heart failure – Social support (including social contacts and close confidants) did not correlate with heart failure at the same time
Berkman et al. (1992)	Mixed (35% > 1 MI)	194 (51.5% men) Age > 64	Interview of emotional support and the structure of social network	T1: before discharge T2: 6 months	T1 Mortality: lack of emotional support at T1 significantly correlated with T1 mortality after controlling other variables T2 Mortality: lack of emotional support at T1 significantly predicted T2 mortality after controlling clinical variables (odds ratio = 2.9, $p < 0.05$)
Wilcox et al. (1994)	Mixed	106 (47.2% men) mean age = 72.6	1. Number of support sources; adequacy of emotional, task & financial support 2. interview	T1: in hospital T2: 6 weeks post-MI T3: 6 months	Functional disability (Activities of Daily Living Scale, ADL, Katz, 1970) T2 less disability was predicted by T1 adequacy of emotional support ($p = 0.009$) T3 less disability was predicted by T2 adequate task support($p = 0.009$)
Thomas et al. (1997)	Mixed	T1: 424 T2: 348	Social support questionnaire (SSQ, Sarason et al., 1983)	T1: in hospital T2: 3-6 months	T1 perceived support did not predict T2 mortality
Friedman & Thomas (1995)	Mixed	T1: 424 T2: 369 (314 men)	Social support questionnaire-6 (SSQ6, Sarason et al., 1983)	T1: hospital T2: 1 year	T2 mortality – T1 support was significantly correlated with T2 mortality ($p < 0.05$)
Frasure-Smith et al. (1995a)	Mixed	T1: 222 (78% men) no age limit	Blumenthal Perceived Social Support Scale (BSSS, Blumenthal, 1987) Using ≥ 66 as the cut-off in this study	T1: 5-15 days post-MI T2: 6 months T3: 12 months	T3 cardiac recurrent: T1 social support was not a significant predictor of T3 all cardiac events (odd ratio, OR = 1.46, $p = 0.32$) At T1, 22.7% (49/216) scored lower than 66
Helgeson (1991)	Mixed	90 (70 men)	1. The presence of a confidant aside from the spouse & spouse disclosure 2. Quantitative support interview	T1: soon after discharge T2: 3 months T3: 6 months T4: 1 year	physica1 outcomes- T4. re-hospitalisation - For men only: low support was correlated ($r = -0.5$, $p < 0.01$) T4. Level of chest pain - low support was correlated ($r = -0.25$, $p < 0.01$) T4. perceived health – low support was correlated ($r = 0.21$, $p < 0.05$)
Rankin (2002)	Mixed	76 women	The support requirement interview (SRI) (Rankin, 2002) – 22 items to measure care-giving behaviours, instrumentally or emotionally supportive, range from 0-2	(T1: before discharge) (T2: 1 week post-discharge) T3: 6 weeks T4: 6 months T5: 1 year	1. Perceived health and psychological stress (Duke Activity Status Index, DASI, Nelson, 1991) T3 total support predicted T3 cardiac function ($p = 0.013$), but not at T4 & T5 2. Psychological distress (POMS, Shacham, 1983) – T3 support did not predict T3, T4 or T5 distress
Case et al. (1992)	Mixed	1234 (24.5%male)	1. the number of persons living with patients; marital status 2. interview	T1: 3-15 days post-MI T2: every 4 months up to 12 -50 months	T2: cardiac events or death Living alone is a risk factor for both outcomes with a hazard ratio = 1.54 ($p < 0.03$), but a disrupted marriage was not an independent risk factor
Jenkinson et al. (1993)	Mixed	1376 (1073 men)	Family social support, other aspects of social circumstances like social isolation	T1: 7 days T2: 2.5 -3.75 years	Physical: mortality – T1 support (isolation) was correlated with T2 mortality (Hazard ratio = 1.49, $p = 0.044$)
Ruberman et al. (1984)	Mixed	2320 (men)	Social isolation	T1: 6 weeks post-MI T2: 3 years	T2 physical: mortality – Social isolation increased the mortality risk (risk ratio = 2.0, $p < 0.001$)
Farmer et al. (1996)	Mixed	596 (388 men)	1. Marital status, living alone or not, number of helpers 2. Interview	T1: hospital T2: 43 months	physical: mortality Relative risk = 1.89 ($p < 0.05$)
Greenwood et al. (1995)	mixed	1283 (999 men)	Self-designed questions asking marital status, social contacts and satisfaction	T1: 7 days in hospital T2: 4.7-6.3 years	T2 mortality: The relationship between support and T2 mortality was positive but not significant (Ps. Car ownership had hazard ratio = 1.4, $p < 0.05$)
Frasure-Smith et al. (2003)	Mixed	896 (664 men) age = 59.4 ± 11.2	1. PSSS (Zimet et al., 1988) < 65 – low support 2. social network: number of close friends < 1 number of close relatives < 2	T1: hospital T2: 1 year T3: 5 year	T1 perceived support ($p = 0.49$), close friends ($p = 0.45$) & close relatives ($p = 0.24$) did not predict T3 (cardiac) mortality
Beach et al. (1992)	**Yes**	17 couples (14 men & 3 women)	1. Social support inventory (Cook, 1982)	T1: in hospital T2: 3 weeks T3: 3 months T4: 6 months	Physical: Myocardial Infarction Recovery Index (Utz, 1989) no significant relationship between the spouse's social support and patient's recovery
Winefield (1982)	**Yes**	53 MI males vs. 52 healthy control	1. Social environment questionnaire (Winfield, 1979) 2. self-reported	T1: hospitalisation T2: 6-7 months	physical: 1. The number of continuing symptoms - T1 the number of confidants at home negatively correlated with T2 symptoms ($r = -0.25$) and the number of confiders in self at T1 negatively correlated with T2 symptoms ($r = -0.31$), $p < 0.10$, one-tailed. 2. self-reported health - the number of confidants at home at T1 positively correlated with T2 health ($r = 0.29$), T1 confiders in self also positively correlated with T2 health ($r = 0.27$), $p < 0.10$. Ps. No difference on support between 2 groups. Therefore this suggested a possible mediating, not directing effect of support
Pedersen et al. (2004)	**Yes**	T1: 112 T2: 104 Age = 61 ± 9.5	CSS (Joseph et al., 1992) – measuring total support and support satisfaction	T1: 4-6 weeks T2: 9 months	Cardiac recurrent – T1 total support (OR = 0.90, $p < 0.01$) & support satisfaction (OR = 0.72, $p = 0.10$) both predicted T2 cardiac events
Ell & Haywood (1984)	**Yes**	T1: 114 T2: 75 T3: 60	1.The Coping with Serious Illness Battery (Stewart, 1983) 2. The Family APGAR Index (Smilkstein, 1978) – assessing family members' satisfaction with family functioning and support from the family: adaptation, partnership, growth, affection, and resolve	T1: hospital T2: 6 months T3: 1 year	1. objective physical outcome (The New York Heart Association Functional Classification) 2. subjective physical outcome: self-reported health status 3. psychological outcomes: overall functioning feelings T1 social support significantly correlated with better T2 physical and subjective health. Also, T2 support significantly correlated with T3 health All positively associated ($p < 0.05$)
Welin et al. (2000)	**Yes**	275 (230 men, 45 women) < 65 years old	The Broadhead questionnaire (Broadhead, 1982) : ≤ 17 represents low support	T1: 1 months post-MI T2: 3 months) T3: 10 years	T3 coronary/all cause mortality was predicted by T1 lack of support

3.2.4.2. Social support and MI patients' psychosocial wellbeing in cross-sectional studies

Table 3.10 summarises seven studies, which used cross-sectional design to examine social support and MI patients' psychosocial progress. Only one study recruited first-time MI patients.

No matter whether support was measured during patients' hospitalisation or after six months post-MI, all of these studies reported a positive correlation between social support and psychosocial wellbeing at the same time. For example, support was positively correlated with positive mood (Bennett, 1993), negatively correlated with anxiety (Bennett et al., 1999b), and with depression in some studies (Bennett et al., 1999b; Boersma et al., 2005; Pedersen et al., 2002). Besides, social support (instrumental support) was also positively linked with fewer physical limitations. Wingate (1995) found that the more support the MI patients' perceived, the better quality of life they reported.

Table 3. 10. Cross-sectional studies of social support and MI patients' psychosocial wellbeing

First author	1st MI or not	Sample	Social support measure	Measure times	Outcomes
Bennett (1993)	mixed	81 (65 men) age = 58 ± 10.7	30-item ISEL (Cohen et bal., 1985)	2–12 weeks post-MI	1. Positive mood (The Bipolar Profile of Mood State, POMS-BI, Lorr & McNair, 1984) – positive correlation with support ($r = 0.33$, $p < 0.05$) 2. Problem-focused coping (Way of Coping Questionnaire, WCQ, Folkman & Lazarus, 1988a) –significant positive ($r = 0.36$, $p < 0.05$) 3. Coping effectiveness (McNett Coping Effectiveness Questionnaire, MCEQ, McNett, 1989) – significant positive correlation ($r = 0.60$, $p < 0.05$) 4. Uncertainty (Multiattributed Ambiguity Scale of the Mishel Uncertainty in Illness Scale, MUIS – Community form, Mishel, 1984, 1986) – significant negative correlation ($r = -0.45$, $p < 0.05$)
Bennett et al. (1999b)	mixed	43 men (& wives) men age = 65 ± 8.2	Duke social support questionnaire; (Broadhead et al., 1988)	Post discharge	1. psychological outcome: depression & anxiety (HAD) - The quantity of support contributed 24% of the variance of anxiety, but it did not significant explain depression. 2. physical limitations (The Peel Index, Peel et al., 1966) - only instrumental support associated with physical limitations ($r = -0.39$, $p < 0.01$)
Boersma et al. (2005)	mixed	113 (84 men) Age < 70 age = 54.1 ± 10.3	Multidimensional Support Questionnaire for Heart Patients (MSQ-H, Boersma & Van Elderen, 2000)	18-21 weeks post discharge	Depression: Significant but small negative correlation ($r = -0.33$, $p < 0.01$). The stronger the MI patients felt for inadequate support, the more depressed they were, but social support was not a significant predictor to depression. Quality of life (MacNew heart disease health-related quality of life questionnaire, Lim et al., 1993)– Social support significantly contributed to same time quality of life, after controlling baseline quality of life and others
Derenowski (1988)	Mixed	Phase I: 31 Age = 62 ± 8.3 Phase II 39 Age = 60 ± 12.1 Phase III: 35 Age = 60 ± 8.7	The Social Relationship Scale (McFarlane et al., 1980) 7-point self-report to measure 6 categories of types, quality and perceived helpfulness of support availability	T1: 7 days post-MI T2: 184 days T3: 247 days	Psychological outcome - Wellness motivation (The self-motivation Inventory, Dishman et al., 1980) - Social support had a significant cross-sectional correlation with wellness motivation at each assessment (T1, $r = 0.43$, T2, $r = 0.36$, T3, $r = 0.26$, $p \leq 0.05$)
Welin et al. (1996)	Mixed	MI: 343 (288 men) Control: 412	1. Interview schedule for social interaction (ISSI, Henderson, 1980) 2. Broadhead questionnaire 3. Frequency of social activities during the previous year; 2 & 3: Self-report	3-6 days hospitalisation	There was no difference on size and satisfaction of social network. However, MI patients had lower emotional support and lower social activities than the healthy control group
Wingate (1995)	Mixed	96 women age = 65.9 ± 11.1	Social support questionnaire (Sarason et al., 1983)	Mean 48.9 days post-MI	Psychological outcome - Quality of life (Quality of Life Index, QLI, Cardiac III, Ferrans & Powers, 1985) - Social support positively correlated with quality of life ($r = 0.56$, $p < 0.01$)
Pedersen et al (2002)	**Yes**	112	Crisis support scale (CSS)	4-6 weeks post-MI	Depression (Trauma Symptom Checklist, Briere & Runtz, 1989) - Satisfaction of support accounted for depression, but not for anxiety

3.2.4.3. Social support and MI patients' psychosocial wellbeing in longitudinal studies

Eight studies used longitudinal design to measure social support and MI psychosocial progress (Table 3.11), with six studies recruited first-time MI patients.

Table 3. 11. Social support and MI patients' psychosocial wellbeing in longitudinal studies

Authors	1st MI or not	Sample	Measure times	Measures	Results
Barefoot et al.(2003)	Mixed (25% > 1 MI) 35% with previous depression	196 (63% men) 25% with previous MI	T1: hospitalisation T2: 2 weeks later	1. ENRICHD social support instrument (ESSI, Mitchell, 2003) 2. PSSS (Zimet et al., 1988) 3. Inventory of Socially Supportive Behaviours (ISSB, 1981) 4. New Haven EPESE Social Network Index (SNI, Berkman & Syme, 1979) 5. McLeod Conflict Scale (6 items, MCS, McLeod et al., 1992) – measuring negative side of relationships	T1 Depression (measured by BDI, HRSD)- T1 total support (PSSS & ESSI) had the strongest association with T1 depression. Age negatively correlated with depression T2 depression - After controlling T1 depression, high levels of PSSS (family, significant other), SNO (relatives), ESSI and low MCS (friends) at T1 and age predicted low T2 depression (BDI, cognitive scale), but not BDI-somatic depression or HRSD Most social network didn't correlated significant with T1 depression
Brummett et al. (1998)	Mixed	T1: 620 T2: 506 (68.2% men) Age = 63.4 ± 11.4	T1: in hospital T2: 1 months after T1	ISEL (Cohen et al., 1985) – short version (16 items)	Depression at T2 – Social support predicted T2 depression (as well as T1 depression)
Frasure-Smith et al. (1995a)	Mixed	T1: 222 (78% men) no age limit	T1: 5-15 days post-MI (T2: 6-months post-MI) (T3: 12-months post-MI)	Blumenthal's Social Support Scale (BSSS, Blumenthal et al., 1987)	T3 cardiac recurrent – T1 Perceived social support did not predict T3 cardiac events
Frasure-Smith et al. (2000b)	Mixed	887	T1: 7 days hospitalization T2: 1 year	Perceived Social Scale (Zimet et al., 1988)	Depressed (BDI ≥ 10) patients at T1 also had significant lower perceived support ($p < 0.0001$) Social support and T1 depression had significant interaction and the interaction was significant with 1 year mortality, after controlling others. At low - middle level of support, depression's influence on cardiac mortality was significant, but at highest quartile of support, no depression-related increase in cardiac mortality
Dickens et al. (2004a)	**Yes**	T1: 314 (199 men) age: 57.6 4 ± 11.2 T2: 269	T1: in hospital T2: 1 year	1. Social intimacy (Brown, 1978) 2. Social contact frequency	T2 Depression - T1 social isolation predicted T2 depression
Drory et al. (1999) (2002)	**Yes**	T1: 290 men T2: 209 men (age = 52 ± 8) (30 – 65)	T1: before discharge (T2: 6 months after discharge) (T3: 5 year)	Multidimensional scale of perceived social support (MSPSS) (Zimet et al., 1988)	1.T2 Psychosocial adjustment to illness Scale (PAIS-SR, Dorogatis, 1986) - T1 total perceived support predicted 3 out of the 7 domains (domestic& social environment, extended family relationships) of worse adjustment 2. T2 & T3 - Psychological wellbeing & psychological distress (Mental Health Inventory, MHI, Veit & Ware, 1983): T1 total perceived support predicted T3 psychological wellbeing.
Ostergren et al. (1991)	**Yes**	40 (22 control & 18 cases)	T1: hospitalisation (T2: 6 weeks post discharge) (T3: 6 months post-MI)	1. Social network – measuring contact frequency with family members; social anchorage (quality of network); social participation (social activities); the 'Modified Alameda County' Index of social network (Berkman & Syme, 1979) 2. Social support – measuring emotional support, informational support and marital support	T2 & T3 Physical working capacity - T1 high contact frequency with family members and low material support were significantly correlated with low physical working capacity at T2 & T3.
Riegel & Dracup (1992)	**Yes**	111	T1: 28 ± 3 days post discharge T2: 4 months	1. UCLA Social support inventory (Dunkel-Schetter et al., 1986) - measuring overprotection (subtracting desired support subscale from the received support scale)	1. 81 were overprotected; 28 had no enough support 2. T1: overprotected patients were less anxious, less depressed (measured by POMS, McNair et al., 1981) 3. T2: Inadequately supported patients were more angry and emotionally more dependent on others
Rost & Smith (1992)	**Yes**	143 (93% men) age = 51.2 ± 8.6	T1: 9.8 days in hospital T2: 4 months T3: 1 year	The RAND Corporation Social Well-Being Index (Donald & Ware, 1982)	1. physical (return to work) at T2 - 90 (63%) returned to work and remained employed at T2 ($p < 0.05$). Those returned to work earlier had higher support at T1 ($p < 0.05$), but support could not predict 'return to work' at T2 & T3 2. emotional distress at T2 & T3 (the RAND Corporation Mental Health Index, MHI, Ware, 1979) – support could not predict emotional distress at T2 & T3
Soejima et al. (1999)	**Yes**	111 married men age = 54.3 ± 7.1 age < 66	T1: 24.8 days hospitalisation T2: 8 months later	Japanese version social support for measuring the number of emotional network (Munakata, 1990)	Delay in returning to work at T2 was predicted by low social support during hospitalization ($p = 0.021$)

Whether the participants were first-time MI patients or not, all the eight studies showed positive results between social support and MI patients' moods, psychosocial adjustment, working capacity and return to work. Those with higher perceived support tended to report less depression, better working capacity and quicker return to work. However, one should note that Ostergen et al. (1991) recruited only 40 MI patients.

Frasure-Smith et al. (2000b) pointed out that "...depressed patients who had the least support tended to experience more symptoms of depression at T2 (1 year) than would have been expected on the basis of their baseline BDI scores. In contrast, depressed patients with higher support tended to show fewer depression symptoms than predicted. The only support measure unrelated to BDI changes was whether patients reported having any close friends...." The result of this study indicated that the effects of social support might mediate depression. Besides, different support sources may have different effects on depression.

3.2.4.4. Stability of social support over time

Another important factor is whether support perceived by MI patients changes over time. In spite of the fruitful research on social support and MI, only four studies examined the stability of support (Table 3.12).

Table 3. 12. Stability of MI patients' perceived social support

Authors	1st MI or not	Sample	Social support measure	Measure times	Stability of support
Kristofferzon (2005)	**Yes**	T1: 171 (97 men) T2: 154 (89 men) T3: 148 (88 men)	Social support questionnaire (Hanson et al., 1997) – 22 items measuring social network (social anchorage and social participation) and 2 scales for support (instrumental & emotional support)	T1: 1 month T2: 4 months T3: 12 months	T1: 31-35% rated low social participation T1-T3: Three most supportive people over time were children, partners, and friends. Social network and support were stable over time. No differences between genders
Pedersen et al. (2004)	**Yes**	T1: 112 T2: 104 Age = 61 ± 9.5	CSS (Joseph et al., 1992)	T1: 4-6 weeks T2: 9 months	Both total support and support satisfaction decreased significantly from T1 to T2 (both $p < 0.01$)
Wieslander et al. (2005)	**Yes**	T1: 240 T3: 153 Age < 70, women	14-item self-designed questionnaire measuring general support (4 items), support from relatives (3 items), support from friends (4 items) & professional support (3 items)	T1: before discharge T2: 1 year T3: 4 year	1. general support: T2-T3 decreased significantly ($p = 0.0007$) 2. support from relatives: T1-T3 decreased significantly ($p = 0.010$) 3. professional support: T1-T2 decreased significantly ($p < 0.0001$) 4. professional support: T1–T3 decreased significantly ($p < 0.0001$) No significant difference on support from friends from T1-T3
Wilcox et al. (1994)	mixed	106 (47.2% men) mean age = 72.6	1. Number of support sources; adequacy of emotional, task & financial support 2. interview	T1: hospitalisation T2: 6 weeks post-MI T3: 6 months	1. availability of someone to count on for support - The change from 'having someone' or 'no need' to 'having no one' was significantly more likely than change in the opposite direction from T1 to T2 and T1 to T3 ($p < 0.05$ for both) 2. financial support availability - change from 'have someone' to 'have no one' or 'no need' was significantly more likely than change in the opposite direction from T1 to T2 ($p < 0.001$) and T1 to T3 ($p < 0.0001$). 3. numbers of sources of support – the numbers of emotional support sources increased significantly ($p < 0.0005$). 4. adequacy of support - the percentage of emotional support and financial support adequacy was stable; but task support adequacy increased significantly ($p < 0.05$)

Table 3.12 shows that only one study (Kristofferzon, 2005) reported that MI patients had stable perceived support over twelve months. Of the remaining three studies, two measured only first-time MI patients and one measured others. All reported a significant decrease in support between six months, one year to four years post-MI.

A large number of studies have examined the relationship of social support and MI. However, most of them recruited a mixed group of patients i.e., with first-time MI and patients with previous MI. Of the reviewed studies, Dickens et al. (2004), Drory et al. (1999, 2002), Pedersen et al. (2004), Rost & Smith (1992) and Welin et al. (2000) recruited a large number of first-time MI patients, used a longitudinal design and followed their patients for at least 9 months (Pedersen et al., 2004) for up to 10 years (Welin et al., 2000). They all used multivariate analyses to test the independent predictive power of social support, while controlling for other relevant confounding variables.

In summary, although there were limitations to many of the studies, most of them reported that perceived support positively correlated with MI patients' quality of life, positive moods, and improved physical functioning or mortality. It was also found that perceived support continued to decrease significantly over time. However, while the focus has been on perceived support, one should be aware that perceived support has also been criticised as sometimes unhelpful, i.e., if the support perceived is unwanted. Therefore, it is important to examine what degree of perceived social support MI patients require.

3.3. Coping

3.3.1. What is coping?

'Coping' is a common word in daily life. Although numerous definitions have been suggested, its core meaning is the individual's cognitive, emotional and behavioural efforts to manage the demands of stress (Katz et al., 1996; Lazarus and Folkman, 1984; Roesch & Weiner, 2001). Lazarus and Folkman (1984) described coping as - "constantly changing cognitive and behavioural efforts to manage...." further indicates that coping strategies may vary across different types of stress and over time (Pretzlik & Sylva, 1999).

The main goal of coping is to reduce or eliminate stress in order to return to normal or better functioning. Since stress is the main trigger of coping, it is important to understand the meaning of 'stress' and 'stressor' before reviewing coping.

3.3.1.1. Stressor and stress

A stressor is a factor that causes stress. There have been three main approaches to define stress: *stimulus approach*, *response approach*, and *relational approach*. Stimulus approach refers to any change in the environment, namely stimulus, was stressful because changing events will make adaptational demands and the need to cope (Holmes & Rahe, 1967). Contrarily, in the response approach, stress is defined as the reaction to stressful stimuli. The third approach defines stress as the particular relationship between the person and the change around him/her. Changes can be physical, emotional, environmental/social and financial. If the person perceives the demands from that change exceeds the personal and social resources that he/she can mobilise, he/she will experience stress (p.141, Lazarus & Folkman, 1984).

Lazarus and Folkman (1984) further used "primary appraisal" and "secondary appraisal" to conceptualise the appraisal process related to stress. Primary appraisal involves assessing the personal meaning of an event and indicating whether the event/stressor has positive, neutral, or negative meanings for the individual. The assessment criteria include one's values, goal commitments, belief about self and the world, and situational intentions. Secondary appraisal focuses on what can be done about this stressful person-environment relationship after it has been detected. Therefore secondary

appraisal is the cognitive evaluation of coping options/strategies (Lazarus, 1999), and coping is the process or behaviour of executing the chosen option(s).

3.3.1.2. Coping approaches

Research on coping is divided into two approaches, trait (inter-individual) approach and process (intra-individual) approach.

The trait approach tries to identify basic coping styles used by individuals across different stressful situations. There are three ways to view coping from trait perspective:

- To describe coping patterns that seem to be habitual;
- To take personality trait into account and consider how personality may influence stable coping action patterns;
- To think that certain environmental conditions can be made functionally equivalent by a trait (e.g. goal commitment or belief) to trigger similar coping responses.

Process approach tries to identify basic coping behaviours or strategies used in particular types of stressful situations and to classify them into different coping dimensions. Of the researchers who adopt this approach, Lazarus and Folkman are two of the most active researchers.

3.3.1.3. The taxonomy of coping function and coping strategies

In terms of classifying coping function and strategies, some researchers regarded coping as a hierarchical structure and tried to combine different coping strategies into higher order constructs. In a meta-analytic review of coping and illness, three main taxonomies were identified (Roesch & Weiner, 2001). The basic taxonomy emphasises the individual's *orientation/focus* and activity in response to a stressor, namely approach/active vs. avoidance coping. Approach/active coping is either behavioural or psychological responses used to change the stressor itself or how the person thinks of it. It includes strategies such as optimistic comparisons (Patterson & McCubbin, 1987), efforts to control the stressful situation (Holahan & Moos, 1987) and problem solving (Endler & Parker, 1990). Avoidance coping, which can include denial, alcohol/drug abuse and withdrawal (Moos & Schaefer, 1993), often keeps people away from directly

addressing the stressful events. In general, it is thought that approach/active coping is more useful than avoidance coping (Holahan & Moos, 1987).

The second taxonomy looks at the *method* of coping (cognitive vs. behavioural) across with the *focus* of coping (approach vs. avoidance) (Holahan et al., 1996), and there are four categories: cognitive approach, behavioural approach, cognitive avoidance and behavioural avoidance.

The third taxonomy identifies *problem-focused* and *emotion-focused* coping (Lazarus & Folkman, 1984; Smith et al., 1997; Lazarus, 1993). Problem-focused coping serves to solve, re-conceptualise, or minimise the effects of stressful situations. Emotion-focused coping aims at regulating emotions that are aroused by the stressful situations. Typical problem-focused coping strategies include planning, seeking instrumental support and active coping. Specific emotion-focused coping includes venting emotions, positive re-appraisal, and seeking emotional support. People use both types of strategies to deal with most stressful events. However, the type of coping strategy which a person selects could be determined by one's personality and the types of stressors one faces (Folkman & Lazarus, 1980).

3.3.2. How is coping measured?

In terms of measuring coping, the majority of studies used quantitative methodology in questionnaires (standardised or open-ended). Schwarzer & Schwarzer (1996) suggested that in addition to considering whether the measurement tool is theoretically-driven or not, three other key characteristics are also important: stability (the pattern similarity of interpersonal differences across multiple time points); generality (coping responses across different situations); and dimensionality (hierarchical orders of coping strategies).

A number of standardised questionnaires have been used to measure coping. Table 3.13 summarises a number of coping scales that have been used in MI studies and the description of each questionnaire.

Table 3. 13. A summary of popular coping measure scales in cardiac research

Name of Coping questionnaire	Coping dimensions	Comment
Billings & Moos Coping Strategies Questionnaire (CSQ, 1981) 19 yes-no items	Measuring 3 coping methods (active cognitive, active behavioural, avoidance coping) and can also measure 2 coping functions (problem-focused coping and emotion-focused coping)	Without high internal consistency
COPE (Carver et al., 1989) 15 types of coping strategies (4 items each type)	1. *Positive reinterpretation and growth (interpreting the stressor in a favourable way)* 2. Mental disengagement (psychological disengagement from the goal with which the stressor is interfering, e.g. day dreaming) 3. Focus on and venting of emotions (increasing the awareness of distressful feelings and the tendency to ventilate these feelings) *4. Use of instrumental social support (seeking assistance about what to do)* 5. Active coping (taking action to remove or evade the stressor) 6. Denial (refusing to accept the reality of the stressor) *7. Religious coping (increasing engagement in religious activities)* 8. Humour (making jokes about the stressor) 9. Behavioural disengagement (stop making effects to attain the goal with which the stressor is interfering) 10. Use of emotional social support (getting sympathy from others) *11. Substance use (using alcohol or drugs to disengagement oneself from the stressor)* 12. Acceptance (accepting the stressor has occurred and is real) 13. Planning (thinking about how to deal the stressor) 14. Restraint (holding back one's attempts to cope) 15. Suppression of competing activities (suppressing attention to other activities in order to focus on the stressor)	Theoretically –driven Stable factors Measuring state or trait (dispositional) *coping* Time consuming
Brief COPE (Carver, 1997) 14 types of strategies for either trait or state coping	Positive reframing; Self-distraction; Venting; Use of instrumental support; Active coping; Denial; Religion; Humour; Behavioural disengagement; Use of emotional support; Substance use; Acceptance; Planning; Self-blame (blame self for what has happened)	Same as above and also time-saving
Coping Inventory for Stressful Situation (CISS) (Endler & Parker, 1990): 48 items to measure 3 coping dimensions	1. Task-oriented (dealing with the stressor directly); 2. Emotion-oriented (dealing with the emotions which are caused by the stressor) 3. Avoidance-oriented coping (avoiding the stressor. There were two types of avoidance-oriented coping: distraction and social diversion)	Empirically-driven with 3 factors mainly for measuring dispositional coping
General Coping Questionnaire (GCS) (Brink, 2002ab) Measuring 8 coping themes/strategies	1. Self-trust 2. Problem-focusation 3. Acceptance 4. Social trust 5. Minimisation 6. Resignation 7. Protest	Empirically-driven
Jalowiec Coping Scale (JCS) (Jalowiec et al., 1984): 60 items to measure 8 types of cognitive and behavioural coping strategies	1. Confrontive (make efforts to change the situation) 2. Evasive (put off facing up to the stressor) 3. Optimistic (try to think positively) 4. Fatalistic (accept the situation because of the belief that very little can be done) 5. Emotive (keep worrying about the problem) 6. Palliative (try to keep busy and work harder) 7. Supportive (depend on others to help out) 8. Self-reliant (prefer to work things out by themselves)	Empirically-driven Dispositional coping
Levine Denial of Illness Scale (LDIS) (Levine et al., 1987; Jacobsen et al., 1992a) semi-structured interview	24 items were categorised into 4 factors: Cognitive denial of illness; Denial of impact on future; Denial of need for care; Affective denial	Empirically-driven
Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus, 1988a) 66 items (4-point Likert scale) with 8 coping strategies	1. Confrontive coping (using aggressive efforts to face stressor) 2. Distancing (detach oneself from the stressor) 3. Self-controlling (making efforts to regulate feelings and actions toward stressor) 4. Seeking social support (seeking informational, emotional or instrumental support from others) 5. Accepting responsibility (taking responsibility to face the stressor) 6. Escape – avoidance (using wishful thinking or behavioural efforts to avoid facing the stressor) 7. Planful problem solving (making plans to deal with the stressor directly) 8. Positive reappraisal (using positive attitude to judge the stressor)	Empirically-derived; factors are not stable over different population

Based on these summaries and criteria, the COPE scale probably is one of the most appropriate scales among the current popular coping measures. It is theoretically driven and its factors have been reported stable. Besides, it can measure both dispositional and state coping strategies. The brief version of COPE also has the advantage of saving time. Despite that CISS and JCS also have good psychometric properties, they are limited to three factors and are both disposition-oriented only. The WCQ has not been able to provide the same factors across different study populations and the theoretical cross-linked relationships between scales are not considered (Schwarzer & Schwarzer, 1996).

3.3.3. What is the relationship between coping and MI?

A lot of work has been conducted on MI patients and their coping strategies. In general, MI patients use different coping strategies at different stages, including active coping, denial, and acceptance, etc. For example, Holahan et al. (1995) reported that the percentage of approach/active coping was associated with lower levels of concurrent depression. Levine et al. (1987) reported that during hospitalisation, MI patients who used denial reported fewer symptoms and were discharged quicker. However, those deniers also reported poorer physical outcomes one year later. Therefore, after a series of investigations on denial and MI survivors, Soloff and colleagues (Soloff, 1977-1978; Soloff, 1980; Soloff & Bartel, 1979) concluded that denial may be beneficial to MI patients during hospitalisation, but at the later stages, denial may result in non-compliance with medical treatment, which can increase the risk of re-infarction.

To examine the relationships between MI and coping strategies, Table 3.14 and 3.15 review coping and MI according to whether study designs were cross-sectional or longitudinal. Patients with different types of CHD may use different coping strategies, therefore published studies (between 1972-2007) which only examined MI patients were recruited (Appendix A-1).

Table 3. 14. Cross-sectional studies of MI patients' coping strategies

Authors	Sample/ First MI	Assessment time	Coping scales	Most vs. least types of coping strategies	Positive coping Strategies	Positive outcomes	Negative coping strategies	Negative outcomes
Keckelsen & Nyamathi (1990)	30 **Yes**	17-31 days post-MI (mean = 24 days)	Jalowiec coping scale (original) (JCS)	X	Problem-focused coping	Better social adjustment	Emotion-focused coping	Higher psychological distress & poorer social adjustment (Psychological Distress & Social Environment Scale, Derogatis, 1977)
Scherck (1992)	30 **Yes**	In-hospital (4-5 days post-MI)	JCS (revised, Jalowiec, 1984)	Most used: optimistic coping Least used: emotive and palliative coping	X	X	X	X
Lowery et al. (1992)	152 **Yes**	In-hospital (after 3 days post-MI)	Levine denial of illness scale (LDIS)	X	Denial	Lower anxiety (Multiple Affect Adjective Check List MAACL, Zuckerman & Lubin, 1985)	X	X
Bennett (1999c)	37 **Yes**	In-hospital	Brief COPE	Most used: acceptance Least used: drug use	X	X	1. Distraction, venting, planning, seeking emotional support, disengagement & active coping 2. Denial, venting, planning, disengagement	1. Higher in-hospital anxiety (HADS) 2. Higher in-hospital depression
Bennett (1999c)	35 **Yes**	3 month post-MI	Brief COPE	Most used: acceptance Least used: drug use	X	X	1. Seeking instrumental support 2. Mental disengagement	1. Higher depression 2. Higher anxiety
Chalfont & Bennett (1999)	59 **Yes**	3-12 months post-MI	COPE (original)	Most used: acceptance Least used: alcohol & drug use	planning	Participants engaged in more positive health-related behaviour (the Health related behaviour questionnaire, Bennett et al., 1995)	1. Mental disengagement 2. Humour & seeking instrumental support	1. Higher anxiety (HADS) 2. Higher depression
Lowe et al. (2000)	128 **Yes**	In-hospital	COPE	Most used coping: acceptance-focused coping factor, followed by problem-focused coping, & social/emotion-focused coping. Lease used: avoidant-focused coping factor	Acceptance-focused coping	Low anxiety (6 item STAI-S); High positive affect (GMS, Denollet, 1993)	1. Avoidance coping 2. Social/emotion-focused coping	1. Higher anxiety 2. Higher negative affect
Lowe et al. (2000)	100 **Yes**	2 months post-MI	COPE	Most used coping: acceptance-focused coping factor Lease used: avoidant-focused coping factor	X	X	1. Social/emotion & avoidant coping 2. Social/emotion coping	1. Higher negative affect & more health complaints 2. Higher anxiety; low positive affect
Lowe et al. (2000)	74 **Yes**	6 month post-MI	COPE	Most used: acceptance-focused coping factor Lease used: avoidant-focused coping factor	Problem- coping	High positive affect	Social/emotion-focused coping	Higher anxiety; High negative affect; More health complaints; & low positive affect

HADS - hospital anxiety and depression scale; MAACL – The Multiple Affect Adjective Check List; GMS – Global Mood Scale

(Continued)

Authors	Sample/ First MI	Assessment time	Coping scales	Most vs. least types of coping strategies	Positive coping Strategies	Positive outcomes	Negative coping strategies	Negative outcomes
Brink et al. (2002a)	114 **Yes**	(T1. 4-6 days hospitalisation) T2. 5 months post-MI	General coping questionnaire (GCQ, Brink et al., 2002a)	T2. Most used: social trust T2. Least used: protest	T2 Minimisation	T2 Better mental quality of life (SF-36, Ware et al., 1994)	T2 fatalism	T2 Lower physical quality of life (after controlling other variables)
Daly et al. (2000)	38 **Yes**	T1.7 days post discharge (T2. 14 days post discharge) (T3. 21 days post discharge)	JCS	Most used: optimistic Most effective: optimistic Least used: evasive Least effective: palliative	X	X	X	X
Garcia et al. (1994)	(T1. 110) T2. 97 **Yes**	(T1. hospitalisation) T2. 1 month post-MI	WCQ	X	T2 Problem solving & positive reappraisal	T2 These two strategies were used more in non-psychiatric MI cases 1 year later	T2 Self-control, seeking social support, escape-avoidance coping	T2 These three coping strategies were used more in psychiatric MI cases 1 year later
Chiou et al. (1997)	40 Mixed	In-hospital	JCS (revised, Jalowiec, 1984)	Most widely used: optimistic coping; Least widely used: emotive coping.	More different types of coping styles	Lower anxiety (HADS)	X	X

JCS – Jalowiec Coping Scale; WCQ – Ways of Coping Questionnaire; HADS – Hospital Anxiety and Depression Scale

Table 3. 15. Longitudinal studies of MI patients' coping strategies

Authors	Sample/ First MI	Assessment time/	Most vs. least used of coping strategies	Stability of coping strategy	Coping measurement	Positive coping Strategies	Positive outcomes	Negative coping strategies	Negative outcomes
Terry (1992)	T1. 40 (T2. 36) **Yes**	T1. 2-3 weeks post-MI (T2. 3 months post-MI)	X	X	Billing's CSQ (1981)	X	X	T1. more emotion-focused coping	T1: Higher state anxiety (Spielberger's STAI-state anxiety, 1970) T2: Higher anxiety & more disruption to social & recreational activities at T2 (Terry, 1992) Emotion-focused coping was not effective at T2.
Lowe et al. (2000)	T1: 128 T2: 100 T3: 74 **Yes**	T1. In-hospital T2. 2 month post-MI T3. 6 months post-MI	1. Most frequently used: Acceptance- type 2. Least used: avoidant-focused coping	Problem-focused coping significantly rose between T1 to T2. The other three coping (acceptance, emotion, & avoidance) were stable from T1 to T3.	Original COPE	T2: Problem-focused coping	T3: Reductions in health complaints between 2-6 months post MI (Health Complaints Scale, Denollet, 1994) Higher positive affect (Global Mood Scale, GMS, Denollet, 1993)	T2: Social/emotion-focused coping	T3: Increased anxiety between 2-6 months (6 item STAI-state anxiety)
Bennett et al. (1999c)	T1. 37 T2. 35 **Yes**	T1. In-hospital T2. 3 month post-MI	Most used: (for T1 & T2) acceptance Least used (for T1 & T2): drug use	Distraction and reframing significantly decreased from T1 to T2	Brief COPE	T1 seeking emotional support	Lower anxiety & less smoking at T2 (HADS)	T1 distraction, denial, venting, re-framing, planning, & disengagement	Higher anxiety at T2
						T1 acceptance & active coping	Lower depression T2	T1 disengagement	Higher depression at T2
						T1 Re-framing & active	More exercise at T2	T1 Disengagement	Less exercise at T2
								T1 Venting & active	More smoking at T2
								T1 Distraction, venting, re-framing, drug	More alcohol at T2
Kristofferzon (2005)	T1: 171 T2: 154 T3: 148 **Yes**	T1: 1 month post-MI T2: 4 months T3: 1 year	1. Most used: optimistic, self-reliant, confrontational coping 2. Least used: palliative & emotive coping	Only fatalistic coping significantly decreased. The other copings were stable	JCS	X	X	X	X

JCS – Jalowiec Coping Scale; CSQ – Coping Strategies Questionnaire; WCQ – Ways of Coping Questionnaire; CISS – Coping Inventory for Stressful Situation; HADS – Hospital Anxiety and Depression Scale

(continued)

Authors	Sample/ First MI	Time of coping measurement	Most vs. least used of coping strategies	Stability of coping strategy	Coping measurement	Positive coping Strategies	Positive outcomes	Negative coping strategies	Negative outcomes
Bogg et al. (2000)	220 Mixed	(T1. hospitalisation) T2. 1 month post-MI (T3. 3 months) (T4. 6 months)	1. Most used: task coping (for both genders) 2. Least used: emotion (for both genders)	X	CISS	T2 Emotion- coping T2 Emotion- coping T2 Task- coping	T4: Better emotional quality of life in both genders at T4 T4: Better social quality of life in males at T4 T4: Better social quality of life in females at T4	T2 Avoidance - coping	T4: Worse emotional quality of life in males at T4
Boersma et al. (2005)	113 Mixed	T1: 2-5 weeks after admission T2: 18-21 weeks after MI	X	X	Leiden Coping Questionnaire for heart disease patients (van Elderen et al., 1998)	T1 approach coping	T2: less depression at T2	X	X
Christman et al. (1988)	T1. 70 T3. 60 Mixed	T1. In-hospital T2. 1-week post-discharge T3. 4 weeks post-discharge	For all 3 occasions: 1. Most used: confrontive/ control-oriented coping 2. Least used: emotive/reactive coping	Emotive coping decreased significantly between T2 & T3. The use of confrontive coping was stable over T2 & T3.	JCS	T1 – T3: Using more control/ confrontive coping	T1 – T3: With less uncertainty and less emotional distress between hospitalisation and 4 weeks post discharge	T1 – T3: Using more emotive/reactive or palliative coping	T2 – T3: Higher emotional distress between T2 to T3.
Levine et al. (1987)	T1: 45 T2: 30 Mixed	T1: hospitalisation T2: first year post-MI	X		Levine Denail of Illness Scale (Levine et al., 1987)	T1: using more denial	T1: discharge quicker; fewer cardiac dysfunction	T1 denial	T2: those used more denial during 1 year follow-up visited hospital more often
Van Elderen et al. (1999)	T1: 278 T2: 278 T3: 232 Mixed	T1: 1 month post-MI T2: 3 months post-MI T3: 12 months post-MI	X	Both approach and avoidance coping were stable over T1 – T3	The Coping Questionnaire for Coronary Patients (CQCP, Maes & Bruggemans, 1988)	T1 approach coping T2 approach coping	T2: Lower anxiety (Spielberger's STAI-state) & depression (Maastricht Questionnaire, Appels et al., 1995) T3: Lower depression & better psychological wellbeing (Medical Psychological Questionnaire for Heart Patients, Erdman, 1982) T3: Lower anxiety & better psychological wellbeing	T1 approach coping T2: approach coping T3: approach coping	T1: Higher anxiety, more depressed, worse psychological wellbeing T2: Higher anxiety, more depressed, less psychological wellbeing T3: Higher anxiety, more depressed, less psychological wellbeing

JCS – Jalowiec Coping Scale; CSQ – Coping Strategies Questionnaire; WCQ – Ways of Coping Questionnaire; CISS – Coping Inventory for Stressful Situation; GMB: Global Mood Scale

Overall, ten cross-sectional and nine prospective studies were reviewed. Thirteen of them recruited first-time MI patients. A number of findings are summarised according to the following themes:

Types of MI patients' coping strategies

Because different coping questionnaires measuring slightly different coping strategies and sometimes researchers even using different statistical approaches to analyse the same coping questionnaire, it is difficult to make a general conclusion about what types of coping strategies MI patients often used.

However, these studies indicated that without considering the number of MI events, during hospitalisation, if the COPE was used to measure coping, 'acceptance' coping was the most common strategy, and 'alcohol/drug abuse' coping was the least used. If the Jalowiec Coping Scale (JCS) was used to measure coping, 'optimistic' or 'confrontive' coping was the most common strategy and 'palliative (keeping busy)' or 'emotive coping (keep worrying)' was the least used strategy. If the Coping Inventory for Stressful Situation (CISS) was used to measure coping, 'task coping' was the most used strategy and 'emotion coping' was the least used one. These different results revealed the multi-dimensional characteristics of coping.

Another difficulty was to decide what type of coping strategy was often used by MI patients at different stages of convalescence, as coping was measured at different time-points for these studies. For example, except for the hospitalisation stage, one could say that during the first three months post-MI, 'acceptance' or 'optimistic' coping was the most common strategy, if using the COPE or the JCS, respectively. Between 3-6 months post-MI, 'acceptance' was still the most common strategy when using the COPE, and 'social trust' was the most common strategy when using the General Coping Questionnaire (GCQ). Overall, due to the differences between coping scales and the times of measurement, it is difficult to make conclusive comments on the most/least common used coping strategies among MI population.

Stability of coping strategies over time

Among the longitudinal studies, five reported the stability of MI patients' coping strategy. Results from two studies using the COPE (brief and original versions) indicated that 'acceptance' continued to be the most common strategy and 'drug use/avoidant'

continued to be the least used strategy over six months were both stable (Bennett et al., 1999c; Lowe et al., 2000). However, these two studies also showed some types of coping strategies changed significantly over time. Bennett et al. (1999c) reported that 'distraction' and 'reframing' coping decreased significantly from hospitalisation to three months post-MI. Lowe et al. (2000) grouped 15 coping strategies into four factors (problem-focused, social/emotion-focused, avoidant-focused and acceptance-focused coping) and reported that problem-focused coping significantly increased between hospitalisation to two months post-MI and the other three coping components were stable over time.

Christman et al. (1988) used the JCS to measure coping from hospitalisation to 4-weeks post-discharge. They reported that 'emotive coping' not only was the least used strategy from hospitalisation to one-month post-MI, its use also decreased significantly after discharge. Using the same scale, Kristofferzon (2005) found that of the eight coping strategies, only 'fatalistic coping' decreased significant over time between 1-12 months post-MI and the other seven coping strategies all remained stable.

Relationships between coping strategies and post-MI moods

- Positive correlations between coping and post-MI moods

Five studies reported the relationships between coping and moods during hospitalisation. Another six studies presented the relationships between coping and moods between post-discharge to six months post-MI, and one study mentioned the relationships between coping and moods after one-year post-MI. In addition, three studies used in-hospital coping and five studies used post-discharge coping strategies to predict moods at the later stages.

During hospitalisation, the use of 'acceptance' (Lowe et al., 2000) and 'denial' (Lowery et al., 1992) positively correlated with lower anxiety. More control/confrontive coping also had positive correlation with less emotional distress (Christman et al., 1988). When looking at a broader context, Chiou et al. (1997) reported that using more types of coping had positive correlations with lower anxiety. Between hospital-discharge to four weeks post discharge, Christman et al. (1988) reported that 'control/confrontive' coping continued to positively correlate with less emotional distress. After six months post-MI, 'problem-focused' coping positively correlated with higher positive affect (Lowe et al., 2000).

A number of coping strategies also had prospective positive correlations with moods. For example, in-hospital 'acceptance' and 'active coping positively correlated with lower depression after three months (Bennett et al., 1999c). 'Approach coping' at one-month post-MI positively correlated with lower anxiety and depression at third and twelfth months post-MI, (Van Elderen et al., 1999), and the same type of coping at 3-month post MI also positively correlated with lower anxiety and better psychological wellbeing at 12-month post event. In addition, Lowe et al. (2000) reported 'problem-focused' coping at two months post-MI positively correlated with a better positive affect at six months post-MI. Boersma et al. (2005) found that after controlling for baseline depression, 'approach coping' at 2-5 weeks after admission predicted less depression at 4 months after MI. However, the study used an unstandarised coping questionnaire.

- Negative correlations between coping strategies and post-MI moods

Although the above findings showed that coping could improve MI patients' moods, not all coping strategies are beneficial. For example, during hospitalisation, 'emotion-focused' coping and 'avoidance coping' had positive correlations with higher anxiety (Terry, 1992; Lowe et al., 2000), higher depression (Bennett et al., 1999c), higher negative affect (Lowe et al., 2000), worse psychological distress (Christman et al., 1988; Keckeisen et al., 1990) or positive affect (Lowe et al., 2000). Even in-hospital approach coping was found to be positively correlated with stronger in-hospital negative moods (depression and anxiety) and worse psychological wellbeing (van Elderen et al., 1999).

After hospital discharge, some coping strategies also had negative impacts on MI patients' moods. For example, Christman et al. (1988) also reported that emotion or palliative coping at one and four weeks post-discharge positively correlated with MI patients' higher emotional distress. The findings during hospitalisation from van Elderen et al. (1999) also repeated at three and 12 months post-MI (i.e., approach coping positively correlated with higher anxiety, depression and worse psychological wellbeing).

Coping strategies also showed long-term negative influences on moods. For example, Bennett et al. (1999c) reported that the use of 'distraction', 'denial', 'venting', 'reframing', 'planning' and 'disengagement' during hospitalisation had positive correlations with high anxiety and depression at three-months post-MI. Christman et al. (1988) also reported that in-hospital emotive or palliative coping positively correlated with higher emotional distress after hospital discharge. After hospital discharge, emotion-focused coping at 2-3 weeks and at two months post-MI also had prospective and positive correlations with

higher levels of post-MI anxiety and depression after three or six months (Terry, 1992; Lowe et al., 2000).

Correlation between coping strategies and other post-MI outcomes

Coping not only correlated with post-MI moods, it also correlated with other outcomes. For example, those who used more 'denial' during hospitalisation tended to have fewer cardiac dysfunction events and left hospital quicker (Levine et al., 1987). Post-discharge 'problem-focused' or 'planning' coping positively correlated with better social adjustment (Keckeisen & Nyamathi, 1990) and healthier behaviour (Chalfont & Bennett., 1999) at the same time, and fewer health complaints between 2-6 months post-MI. In addition, 'emotion-coping' at 1-month post-MI positively correlated with better emotional and social quality at six months post-MI. (Bogg et al., 2000). 'Minimisation' coping also positively correlated with better emotional quality of life after five months post-MI (Brink et al., 2002a).

Of the coping strategies mentioned in Table 3.14 and 3.15, two coping strategies deserved further discussion. First, 'denial' was beneficial for lower anxiety during hospitalisation (Lowery et al., 1992), and less cardiac dysfunction (Levine et al., 1987), but it also positively correlated with more hospital visits during the first year post-MI (Levine et al., 1987). This probably indicated that when traumatic events such as MI just happened, using 'denial' coping strategy might be good for the patients during the acute phase. However, it might interrupt patients' long-term benefits if one continued to use it.

The second strategy should be watched out was 'approach-focused' coping. Although 'approach-focused' coping is generally regarded as useful, in the study of Van Elderen et al. (1999), 'approach coping' positively correlated concurrently with depression, anxiety and worse psychological wellbeing during the first twelve months post-MI. However, those who used more 'approached-coping' at 1-month post-MI tended to have lower levels of anxiety/depression and better psychological wellbeing at the later stage (three and twelve months post-MI). These findings might throw some doubts upon the assumption that 'approach coping' is useful at anytime.

Results of these two coping strategies indicated the role of coping strategy is quite multi-functional and sensitive to different time points and environments. As the whole MI event (from onset to back to normal) may last for several months and patients may face

different challenges at different stages, therefore it is possible that one particular type of coping which is useful at time A may be useless or even harmful at time B.

Coping effectiveness

In addition to measuring coping with psychological/physical outcomes, coping effectiveness also has been examined in cross-sectional designs. Bennett (1993) examined coping strategies and coping effectiveness of 81 participants who had experienced a MI event during the past 12 weeks. She noticed that coping strategies did not directly influence coping effectiveness (in this study 'coping effectiveness' was conceptually defined as a feeling of subjective wellbeing in which the individual was satisfied with his/her functioning during a stressful encounter). Findings from this study also indicated that problem-focused coping strategies correlated with perceived availability of social support and emotion, while emotion-focused coping strategies were related to perceived availability of social support only.

Of these reviewed studies, several suffered from low numbers of participants (Bennett et al., 1999c; Chalfont & Bennett, 1999; Chiou et al., 1997; Christman et al., 1988; Daly et al., 2000; Keckeisen & Nyamathi, 1990; Levine et al., 1987; Scherck, 1992; Terry, 1992). Five studies recruited participants with previous MI experiences (Bogg et al., 2000; Chiou et al., 1997; Christman et al., 1988; Levine et al., 1987; Van Elderen et al., 1999), which may be a confounding variable for coping with MI. Recently, Fox-Wasylyshyn et al. (2007) and colleagues compared how people deal with MI symptoms before seeking help. They found that those with MI experiences ($n = 26$) were more likely to take prescribed medications to deal with their symptoms ($p < 0.001$) when compared with first-time MI patients ($n = 109$). Stewart et al. (1997) also found that first-time ischaemic heart disease patients appraised their illness as less threatening and used less of the 'seeking social support' coping. These two findings indicated MI patients' coping strategies might change, depending on whether they have a previous MI.

This study has shown that for some individuals, coping strategies did not directly influence coping effectiveness. Although not satisfied with their current coping strategies, people might not be able to change their coping strategies or they do not know how to change their current coping strategies. It was also possible that the operational definition of coping effectiveness in this study did not match these people's own definition. In fact, according to the operational definition of the current study, coping effectiveness can be represented by a general definition of psychological wellbeing. Researchers have

emphasised the importance of measuring coping outcomes (Lazarus, 1999; Leventhal et al., 1998, 2001). If coping strategies have no direct influence on coping effectiveness, it is difficult to claim that coping has a direct influence on wellbeing, and maybe one should consider its indirect influences. Therefore, coping and wellbeing need further investigation.

3.4. Conclusion

This chapter reviews theoretical backgrounds of illness perceptions, social support and coping strategies, and their relationships with MI. In general, it indicates that negative illness perceptions correlated with poor post-MI progress, including low probability of returning to work and low quality of life. The lack of social support and 'emotional-focused' coping was associated with poor post-MI recovery. In the following chapter, attention will focus on examination of factors, which may correlate with post-MI depression and anxiety.

CHAPTER FOUR – WHAT FACTORS INFLUENCE POST-MI DEPRESSION AND ANXIETY

Chapter two and Chapter three have described the responses and changes of MI patients' moods, illness perceptions, social support and coping strategies. This chapter examines what factors influence post-MI depression and anxiety with particular emphasis on illness perceptions and social support.

4.1. Who is at risk of post-MI depression or anxiety?

Most of the past studies focused on how negative moods, e.g., depression and anxiety would influence MI patients' progress. However, very few studies have looked at the factors that may predict post-MI depression or anxiety. A review of published articles (1972-2007) which examined depression and/or anxiety as the dependent variables in MI patients is therefore conducted (Appendix A-1).

Based on the review of four studies, it was found that the predictors of post-MI depressive symptoms could include pre-MI vital exhaustion, living alone, history of depressive disorder/MI, female gender were significant predictors of in-hospital and post-discharge depressive symptoms (Spijkerman et al., 2005). Dickens et al. (2004) reported that younger age, female sex, social isolation and lack of a close confidant were related to depressive disorder. Schrader et al. (2004) also reported that younger age, previous cardiac history, previous depression, anxiety or stress, and in-hospital depressive symptoms were strong predictors of 3-month post-discharge depressive symptoms.

In a 5-year prospective study, Bjerkeset et al. (2005) reported that of the 512 first-time MI patients, women had an increased risk for both anxiety and depression in the first two years post-MI, but then the symptoms decreased significantly. Conversely, men's risk in post-MI depression increased after two years post-MI.

Although results from these four studies indicated the importance of gender and age on post-MI depression/anxiety, more evidence is needed. As mentioned in chapter three, illness perceptions, social support and coping were correlated with MI progress. It is important to examine whether these variables would correlate significantly with post-MI

depression or anxiety. Because the relationship between coping and post-MI depression/anxiety has been reviewed in section 3.3, it will not be presented again in this chapter.

4.2. Post-MI depression, state anxiety, illness perceptions and social support

Depression and state anxiety can be influenced by different factors, including biological, psychological and social factors (Strik et al., 2001). Several groups of researchers, e.g., Dickens et al. (2004), Lloyd & Cawley (1982), Lesperance et al. (1996) suggested that pre-MI depression and post-MI depression had different reasons. For example, Lesperance et al. (1996) recognised that hospitalised depressive symptoms could be partly due to the effect of hospital environments. Dickens et al. (2004), Schrader et al. (2004) and Spijkerman et al. (2005) also reported that post-MI depressive symptoms linked with a history of depression, living alone or not, pre-MI vital exhaustion, symptom severity and female gender.

Although different psychological factors may contribute to post-MI depression and anxiety, the following three sections will focus on illness perceptions, social support and gender.

4.2.1. Post-MI depression and state anxiety with Illness perceptions

Table 4.1 lists the correlations of post-MI depression and anxiety with illness perceptions. Only two studies reported illness perceptions (causal attribution) with post-MI anxiety or depression. Unfortunately, one (Jacobsen et al., 1992b) recruited 42 patients and both studies only used univariate comparison or bivariate correlation to examine the relationships between illness perceptions and post-MI depression/anxiety.

Table 4. 1. Illness perceptions with post-MI depression and state anxiety

Illness perception components	Research methods	Authors	Sample	Measuring times	Results
Causal attributions	Interview: 'Why me?'	Jacobsen et al. (1992b)	42 first-MI	T1: 72 hours post-MI/ T2: 3-5 months	T2 anxiety, depression & hostility (Multiple Affect Adjective Checklist, Zuckerman & Lubin, 1965) Those who questioned 'why me?' at T1 were more anxious than those not questioned ($p = 0.01$) at T2.
		Lowery et al. (1992)	152 first-MI	T1: Hospitalisation (after 3 days post-MI)	Those who asked themselves this question and tried to find an answer were more anxious than those not asked this question

Results from these studies indicated that those who tried to look for possible causes for their MI tended to be more anxious during hospitalisation and after 3-5 months. It was possible that when MI patients started to ask themselves 'Why me?,' they also became more nervous while searching for possible answers (also section 3.1.3.5).

Although no specific study reported post-MI depression and illness perceptions, one study reviewed in section 3.1.3.5 revealed the significant correlations between the perceptions of causal attributions and illness consequences with emotional quality of life (French et al., 2005a). Those who attributed their MI to causes like 'stress' or controllable causes and those did not believe in serious MI consequences tended to have a better emotional quality of life.

4.2.2. Post-MI depression and state anxiety with social support

Table 4.2 presents findings of post-MI depression, state anxiety and social support. In total, seven studies are presented.

Table 4. 2. Social support with post-MI depression and state anxiety

Authors	1st MI or not	Sample	Social support measure	Measure times	Outcomes
Bennett et al. (1999b)	Mixed	43 men (& wives) men age = 65 ± 8.2	Duke social support questionnaire; (Broadhead et al., 1988)	Post discharge	depression & anxiety (HAD) - The quantity of support contributed 24% of the variance of anxiety, but it did not significant explain depression.
Boersma et al. (2005)	Mixed	113 (84 men) Age < 70 age = 54.1 ± 10.3	Multidimensional Support Questionnaire for Heart Patients (MSQ-H, Boersma & Van Elderen, 2000)	18-21 weeks post discharge	Depression: The stronger the MI patients felt for inadequate support, the more depressed they were ($r = -0.33$, $p < 0.01$). Social support was not a significant predictor to depression.
Pedersen et al. (2002)	**Yes**	112	Crisis support scale (CSS, Elklit et al., 2001)	4-6 weeks post-MI	Depression (Trauma Symptom Checklist, Briere & Runtz, 1989) - Social support satisfaction accounted for depression, but not for anxiety
Barefoot et al. (2003)	Mixed (25% > 1 MI)	196 (63% men) 35% with previous depression	1. ENRICHD social support instrument (ESSI, Mitchell et al., 2003) 2. PSSS (Zimet et al., 1988) 3. Inventory of Socially Supportive Behaviours (ISSB, Barerra et al., 1981) 4. New Haven EPESE Social Network Index (SNI, Berkman & Syme, 1979) 5. McLeod Conflict Scale (6 items, MCS, McLeod et al., 1992) – measuring negative side of relationships	T1: hospitalisation T2: 2 weeks later	Depression at T2 - High levels of PSSS (family, significant other), SNO (relatives), ESSI and low MCS (friends) at T1 were associated with low T2 depression (BDI, cognitive scale), but not BDI-somatic scale nor HRSD) Most social network didn't correlated significant with T1 depression Ps. Old age significantly predicted low depression after controlling T1 depression.
Frasure-Smith et al. (2000b)	Mixed	887	Perceived Social Scale (Zimet et al., 1988)	T1: 7 days hospitalisation T2: 1 year	Depressed (BDI ≥ 10) patients at T1 also had significant lower perceived support ($p < 0.0001$) at the same time. Social support and T1 depression had significant interaction and the interaction was significant with 1-year mortality, after controlling others. At low - middle level of support, depression's influence on cardiac mortality was significant, but at highest quartile of support, no depression-related increase in cardiac mortality
Dickens et al. (2004b)	**Yes**	T1: 314 (199 men) age: 57.6 4 ± 11.2 T2: 269	1. Social intimacy (Brown, 1978) 2. Social contact frequency	T1: hospitalisation T2: 1 year	T2 Depression - T1 social isolation predicted T2 depression
Riegel & Dracup (1992)	**Yes**	111	1. UCLA Social support inventory (Dunkel-Schetter et al., 1986) - measuring overprotection (subtracting desired support subscale from the received support scale)	T1: 28 ± 3 days post discharge T2: 4 months	T1: Overprotected patients were less anxious, less depressed (measured by POMS, McNair, 1981

Although not all of these studies supported the idea that social support positively correlated with lower levels of post-MI depression and anxiety, most of the findings indicated that those with more support tended to report lower anxiety or depression at the same time. Prospective studies also suggested long-term positive correlations between social support and lower levels of post-MI depression or state anxiety, although social network was not significantly correlated with either of these two moods after MI.

One finding that deserved more attention is identified by Frasure-Smith et al. (2000b). They found that depending on the level of perceived support, the positive effect of social support might change, as those with lower support perceived a stronger negative impact of depression than those who had high support.

4.3. Post-MI depression, state anxiety, age and gender

4.3.1. Post-MI depression, age and gender

Kessler (2003) pointed out the occurrence of different forms of depression in females is twice as many as that of males within a lifetime. About 20% of females experience major depression in their life times (Yonkers & Chantilis, 1995). As there is a higher rate of depression among women than men in general population, and depression is related to life stress (Paykel, 2001), it seems logical to expect that females may become more depressed than males after an MI event. To examine the relationship between depression and demographic factors, Table 4.3 presents 12 studies examined the relationship between post-MI depression, age and gender.

Table 4. 3. Post-MI depression, age and gender

Authors	1st MI or not	Measure times	Sample	Depression measure & cut off	Results
Barefoot et al. (2003)	Mixed (25% > 1 MI)	T1: hospitalisation T2: 2 weeks later	196 (63% men) 25% with previous MI 35% with previous depression	1. BDI (10-15 = mild, 16-23 = moderate, 24-63 = severe) 2. Hamilton HRSD (unknown)	Age - T1 high level of depression was correlated with more co-morbidity, low income, and younger age At T2, after controlling T1 depression, older age still significantly predicted lower depression
Bennett et al. (1999b)	Mixed	Post discharge	43 men (& wives) men age = 65 ± 8.2	HAD ≥ 8	Gender – There was no gender differences on depression
Cherrington et al. (2004)	Mixed	24 – 48 hrs in hospital	49 (50% men) age = 60.8 ± 13.32	BDI (Beck, 1987) 14-19 = mild 20-28 = moderate 29-63 = severe	Gender - No significant difference between genders on depression level
Frasure-Smith et al. (1995b)	Mixed	T1: 5-15 days post-MI (T2: 6 months) (T3: 12 months) (T4: 18 months)	T1: 222 (78% men)	1. Diagnostic Interview Schedule (DIS, Robins et al., 1981)/DSM-III-R (major depression) 2. BDI ≥ 10 (depressive symptoms)	Gender - T1 - women were more depressed than men (p = 0.003)
Frasure-Smith et al. (1999); Lesperance et al. (2002)	Mixed	T1: hospitalisation	896 (69.2% men) age = 59.4 ± 11.2	BDI ≥ 10	Gender - T1 - Women were more depressed than men (11.3 vs. 7.1, p < 0.0001) 47% women were depressed than 25.6% men (p < 0.0001)
Mendes de Leon et al (2001)	Mixed (30% 1st MI)	in hospital	88 (54% men) age = 62 ± 14	BDI (unknown cut-off)	Gender - Women had higher depression score (p = 0.04)
Romanelli et al. (2002)	Mixed	T1: 3 – 5 days hospitalisation T2: 4 months post-MI	T1: 513 (27.1% men) age = 75.4 ± 1.2 T2: 101	BDI ≥ 10 Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd (SCI-DSM-III, Spitzer et al., 1987)	Age – Older patients with depression were more likely to die before T2 than those older patients without depression (26.5% vs. 7.3%, p = 0.002)
Shiotani et al. (2002)	Mixed	T1: 3 months post-MI (T2: 1 year)	1042 MI (age = 63 ± 11)	Zung's SRDS ≥ 40	Age - For older people (age ≥ 65), T1 depression was significantly associated with T2 cardiac events (log rank, p = 0.02), but the association was not significant in the young patients (p = 0.11)
Stern et al. (1977)	Mixed	T1: in hospital T2: 6 weeks post-MI T3: 3 month post-MI T4 : 6 month post-MI T5: 1 year post-MI	68 (80.9% men)	Zung's SRDS (unknown cut-off)	Gender – women were more depressed than men at T1 and T5 (p < 0.01)
Bogg et al. (2000)	**Yes**	T1: 3-4 days post-MI T2: 1 month post-MI T3: 3 month post-MI T4 : 6 month post-MI	220 (76.8% males) age = 60 ± 9.9	HADS (unknown cut-off)	Gender – Women were more depressed than men at T2 & T3
Brink et al. (2005)	**Yes**	T1: 4-6 days in hospital T2: 5 months post-MI T3: 1 year post-MI	98 (66.3% men) age (M) = 64.6 ± 9.8 age (F) = 71.4 ± 8.7	HADS (unknown cut-off)	Gender – Gender effects were unknown for T1 & T2, but no gender difference at T3.
Dickens et al. (2004b)	**Yes**	T1: in hospital T2: 1 year post-MI	T1: 314 (63.4% men) age: 57.6 4 ± 11.2 T2: 269	HADS ≥ 17	Age – Age predicted T1 & T2 depression Gender – Female predicted T1 depression

Five studies recruited less than 100 patients and these may not have statistical power (Bennett et al., 1999b; Brink et al., 2005; Cherrington et al., 2004; Mendes de Leon et al., 2001; Stern et al., 1977). Of these studies, three reported no gender differences (Bennett et al., 1999b; Brink et al., 2005; Cherrington et al., 2004), but the results from seven studies indicated that women were more depressed. Besides, age was also significantly correlated with depression – the younger the MI patients, the more depressed they tended to be.

4.3.2. Post-MI anxiety, age and gender

Nine studies that examined post-MI anxiety and demographic factors are summarised and presented in Table 4.4.

Table 4. 4. Post-MI anxiety, age and gender

Authors	1st MI or not	Measure times	Sample	Anxiety measure & cut-off	Results about age or genders
Bogg et al. (2000)	**Yes**	T1: 3-4 days post-MI T2: 1 month T3: 3 month T4 : 6 month	220 (76.8% males) age = 60 ± 9.9	HADS (Zigmond & Snaith, 1983) (unknown cut-off)	Gender – Women were more anxious than men at all 4 assessments
Bennett et al. (1999b)	Mixed	Post discharge	43 men (& wives) men age = 65 ± 8.2	HAD ≥ 8	Gender - Women were more anxious than men (or wives were more anxious then husbands)
Cherrington et al. (2004)	Mixed	24 – 48 hrs in hospital	49 (50% men) age = 60.8 ± 13.32	STAI-S (unknown cut-off)	Gender – Women were more anxious than men (40.4 ± 13.46 vs. 36.1 ± 12.49). Ps. overall mean score = 38.3 ± 13.04
Frasure-Smith et al. (1999); Lesperance et al. (2002)	Mixed	T1: hospitalisation	896 (69.2% men) age = 59.4 ± 11.2	STAI-T ≥ 43	Gender - Women were more anxious than men at T1 (39.5 vs. 34.1, $p < 0.0001$) 35.9% women were depressed than 18.8% men ($p < 0.0001$)
Gavin et al. (2003)	Mixed	Within 48 hours hospitalisation	410 (68% men)	STAI-State (Spielberger, 1983) (unknown cut-off)	Gender – Women were more anxious than men (40.9 ± 12.6 vs. 37.4 ± 12.3, $p < 0.05$) Gender was a predictor of anxiety
Kim et al. (2000)	Mixed	Within 72 hours hospitalisation	424 (66.3% men) age = 62 ± 13.0	STAI-State (Spielberger, 1983) (unknown cut-off)	Gender – Women were significantly more anxious than men (42 ± 12.9 vs. 37.7 ± 12.5, $p = 0.001$)
Moser et al. (2003)	Mixed	Within 72 hours hospitalisation	912 from five countries (72.1% men)	Brief Symptom Inventory (Derogatis, 1983) (unknown cut-off)	Gender – Statistically, women were more anxious than men, but clinical significance was small. Female vs. Male: 0.76 ± 0.90 vs. 0.57 ± 0.70, $p = 0.005$) Age - under 60 were more anxious than over age 60
Stern et al. (1977)	Mixed	T1: in hospital T2: 6 weeks T3: 3 month T4: 6 month T5: 1 year	68 (80.9% men) mean age = 53	Taylor Manifest Anxiety Scale (Taylor, 1953) (unknown cut-off)	Gender – Women were more anxious than men at T1 and T5 ($p < 0.01$)
Sykes et al. (1989)	Mixed	T1: day 3 post-MI T2: day 6-11 post-MI T3: 3 months	569 (72.2% men)	STAI (Spielberger, 1983) (unknown cut-off)	Gender – Women were more anxious than men (37 ± 11.6 vs. 33.7 ± 10.4, $p < 0.01$) at all times

Three of the nine studies used prospective design to examine post-MI state anxiety and genders. Although some studies had small sample sizes (Bennett et al., 1999b; Cherrington et al., 2004; Stern et al., 1977), all nine studies reported that females were more anxious than male MI patients were. Besides, Moser et al. (2003) also reported that younger patients were more anxious than older ones.

4.4. Conclusion

This chapter reviews factors, particularly illness perceptions, social support and demographic variables such as age and gender, which may influence post-MI depression or anxiety. In general, those who questioned why it happened to them tended to be more depressed or anxious. Those with less support also tended to report more depression or anxiety. In addition, females and younger MI patients tended to feel more depressed or anxious.

Overall, illness perceptions, social support and coping strategies all seemed to have important influences on post-MI depression and anxiety. However, when a serious event such as an MI happens, the patients' family, particularly their caregivers, are also influenced by the event. Therefore, the next chapter will focus on MI patients and the spouses (or partners) and the couples' experiences of the MI.

CHAPTER FIVE – COUPLES' EXPERIENCES OF MI

When a married person has an MI, not only does this person need to learn to cope and live with it, the patient's spouse/partner and family are also influenced by the illness. Research has provided evidence that MI patients' spouses also suffered traumatically and experienced depression and anxiety. Several studies showed that MI spouses' negative feelings were stronger or lasted longer than that of experienced by the MI patients (Bennett, 1993; Gillis, 1984; Rankin, 1992; Rose et al, 1996). This chapter reviews the spouses' responses and the couple's responses when facing an MI (Appendix A-1).

5.1. Spouses' emotional responses

Both qualitative and questionnaire-based designs have been used to examine spouses' mood after a first MI event. Table 5.1 presents the summary of research on moods of MI patients' spouses.

Table 5. 1. A summary of MI spouses' emotional responses

Authors	Sex	Study duration	Study design	Findings
Skelton & Dominian (1973)	65 wives	In-hospital to 3, 6, 12-months post-MI	Interview	1. Hospitalisation – wives felt guilty, self-blamed, depressed, anxious and reported (21%) psychosomatic symptoms. Younger wives experienced more serious anxiety and depression. 2. First 3 months – more wives experienced anxiety, depression, tension and sleep disturbance. 3. 1-year post-MI – only 40% reported satisfactory adjustment. Another 35% reported reasonable adjustment and the rest 25% wives still showed severe emotional disturbance
Mayou et al. (1978)	82 wives	In-hospital to 2, 12-months post-MI	Interview	1. Hospitalisation – about 38% wives reported 'moderately or 'severely' distressed. 2. 2-months post-MI – wives still had considerable psychological symptoms. Wives reported similar levels of depression, anxiety, fatigue, irritability, poor concentration and insomnia as in the patients. 3. 12-months post-MI – wives still showed considerable psychological distress as in the patients. However, they did try to control their temper. 40% of the wives complained of ill health. Wives' distress negatively correlated with their job/marriage satisfaction, and maintenance of leisure activity.
Stern & Pascale (1979)	38 spouses	In hospital & 6-months post-MI	Survey (SRDS scale)	1. Hospitalisation - Ten spouses (26%), all females, were found to be either anxious or depressed 2. 6-months post-MI – Seven (28%) spouses were either anxious or depressed. These 7 spouses also had more marriage problems, distress, and friction.
Bedsworth & Molen (1982)	20 wives	In hospital	Interview	Wives reported 79 types of affective responses. Threat of loss, anxiety, and fear were the most dominant emotions.
Miller & Wikoff (1989)	40 spouses	3-months post-MI	Questionnaire (STAI scale)	Spouses' state anxiety level was not high or low (mean = 39.7, SD = 11.9) when comparing with the norm
Newens et al. (1995)	129 wives	Few days & 3-weeks post discharge	Questionnaire (HAD scale)	1. Few days post discharge – 55% of wives were rated as possibly or probably anxious; 23% were classed as depressed. 2. 3 weeks post discharge – 57% of wives were anxious and 21% were depressed. Of these women, 77% maintained anxious and 76% maintained depressed at both times.
Theobald (1997)	3 wives & 1 husband	1-month post-MI	Interview	Five themes were discovered: Crushing uncertainty, overwhelming emotional turmoil, the lack of information heightened anxiety, (the need for support, and the acceptance of lifestyle changes).
Daly et al. (1998)	7 wives	2 & 4 weeks post-discharge	Semi-structured interview	Four themes were found: Struggle to resolve distress, intensive monitoring of the AMI survivor, searching for avenues of support, and reflecting on the future (reducing threat).
Arefjord et al. (1998)	37 wives	1 week, 3-months & 10-years post MI	Semi-structured interview	1. Hospitalisation – over 73% were classed as severe/moderate anxiety; 35% were classed as severe/moderate depressed 2. 3-months post-MI - 65% were severely/moderately anxious and 51% were severely/moderately depressed 3. 10-years post-MI – 51% were severely/moderately anxious; 46% were severely/moderately depressed
Kettunen et al. (1999)	47 wives & 10 husbands	2 weeks – 4-months post-MI	Questionnaire (self-designed)	1. The most frequent fears reported by the spouses were: recovering problems, a further MI, patient's leisure activities, overprotection, and anxiety of significant others. 2. The most frequent reported symptoms experienced by spouses were: fatigue, sleeping disturbance, anxiety, tension, depressive mood and restlessness.

SRDS: Self-Rating Depression Scale; STAI: State-Trait Anxiety Inventory; HAD: Hospital Anxiety Depression scale

Although the administration time of these studies varied from hospitalisation to long-term stage (maximum 10-years post-MI), in most studies (except Miller & Wikoff's, 1989), spouses reported certain negative feelings like anxiety, depression, fear and distress. Newens et al. (1995) found that after 3-weeks post-discharge, 76% and 77% of spouses were still depressed or anxious. This finding reflected the fact that an MI event not only has an impact on the patients but also on the family. Mayou et al. (1987) also reported similar results. They found that MI spouses had stronger negative emotions than patients, and many spouses (wives) who were distressed during patients' hospitalisation still reported distress one year later. Finally, a 10-year longitudinal study (Arefjord et al., 1998) further reported that after ten years, around 51% of MI wives were still seriously or moderately anxious and 46% of the wives were still severely or moderately depressed.

Arefjord et al. (1998) also noticed that some spouses maintained high scores on anxiety or depression over ten years while others maintained low scores in this period. In addition, those with long-term low levels of anxiety or/and depression had better adjustments and greater support satisfaction while patients were hospitalised or at the convalescent stage. On the contrary, those with long-term high levels of anxiety or/and depression also had more problems and were less satisfied with support they got during patients' hospitalisation or convalescent stage.

5.2. Spouses' illness perceptions of MI

Even though illness perceptions have recently become a major research topic in coronary artery disease (CAD), studies on MI spouses are still sparse. Only four studies specifically measured MI patients' and their spouses' illness representations – One measured spouses' and the other three examined both couples' illness representations. This section reviews the study that only measured spouses' illness representations (Arefjord et al, 2002). The other three studies will be reviewed in section 5.5.

Using interviews in a 10-year longitudinal design, Arefjord et al. (2002) reported that although the agreement on stress causes significantly declined over time, stress-related factors were the most frequently mentioned MI causes during patients' hospitalisation and ten years post-MI. Other causes such as 'medical factors', 'lifestyle factors' and 'personality' did not change significantly.

This study further showed the correlation between wives' causal attributions and their emotions. During patients' hospitalisation and at three months post-MI, the wives who attributed their husbands' personality to MI tended to report higher levels of anxiety and irritability. Those wives who attributed 'stress' as MI causes were more depressed and irritable, whereas 'magical explanations' were related to anxiety ('in this study, 'magical explanation referred to something which could not be explained).

5.3. Social support and MI spouses

Research in social support and MI spouses has mainly examined the spouses' support needs and support satisfaction during patients' hospitalisation. As pointed out in chapter three, social support is considered to correlate with MI patients' physical and psychological wellbeing. With the same reasoning, it is important to examine the effects of different types of support on MI spouses. Table 5.2 lists research on MI spouses' support needs and the influences of social support on their adjustment.

Table 5. 2. A summary of social support and MI spouses

Authors	Measure time	Design	Sample	Support needs	Results/Findings
Hentinen (1983)	8-weeks post-MI	Survey	59 wives	Care information about patients at home from the hospital (informational support)	Wives were not satisfied because health professionals did not provide satisfactory information to them. The family and neighbours were the main support providers.
Thompson & Cordle (1988)	6-weeks post-MI	Survey	76 wives	Informational support from the hospital before discharge	The general care of a heart attack patient and the diet were the least perceived informational support from the health professionals. The family and neighbours were the main support providers.
Theobald (1997)	1-month post-MI	Interview	2 wives & 1 husband	Informational, emotional and practical support	X
Kettunen et al. (1999)	2-16 weeks post-MI	Survey	47 wives & 10 husbands	Support from the health professionals	The spouses' needs from health professionals were unmet in varying degrees. Spouses' fear, emotional distress and vulnerability negatively correlated with the satisfaction of health professionals' support.
Hallaraker et al. (2001)	T1: In-hospital T2: 3 months T3: 10 years post-MI	Interview	37 wives	Quantitative support (emotional & practical support) at time 1 & 2; Satisfaction of support	Only qualitative support (satisfaction) (time 1) was negatively correlated with depression/anxiety at time 2.

Table 5.2 indicates that the MI spouses had similar support needs, mainly emotional and informational support needs. However, the spouses' informational support needs seemed to be often neglected or unmet from the health care providers. One possible reason for this could be that the health professionals did not know what types of support they can provide or what the spouses expected from them, because few studies had

investigated the differences between MI spouses' support expectation from the health professionals and the professionals' opinions.

Two things need further attention: First, very few studies have examined the correlation of MI spouses' psychological wellbeing and their perceived social support. Secondly, it is unknown whether the balance between spouses' perceived available support and desired support would influence their wellbeing.

5.4. Spouses' coping with MI

Previous reviews have shown MI patients used different coping strategies at different stages. In addition, it seemed problem-focused coping was more beneficial than emotion-focused coping. Since spouses' coping strategies probably can influence not only their own wellbeing but also patients' wellbeing and compliance, Table 5.3 summarises MI spouses' coping strategies through hospitalisation to long-term stages.

Table 5. 3. A summary of MI spouses' coping strategies

Authors	Sample	Administration	Design	Positive/negative coping strategy
Stern & Pascale (1979)	25 spouses	In hospital & 6-months post-MI	Survey (Structured & Scaled interview to Assess Maladjustment, Taylor, 1953)	It was unclear to decide whether the spouses used positive or negative coping strategies. Seeking for emotional/professional support, disengagement (keeping busy with other things), active planning were reported.
Bedsworth & Molen (1982)	20 spouses	In hospital	Interview	1. The coping strategies could be classified into 5 types: actions to strengthen, attack, avoidance, inaction, and no action. 2. 66 separate coping strategies were reported in relation to 45 perceived threats. 50% of them consisted of actions aimed at strengthening the individual's resources against harm.
Nyamathi (1987; 1988)	40 wives	The first 6-months post-MI – 20 wives; The other 20 entered between 7-12 months post-MI	Interview	1. Behavioural, cognitive and intrapsychic coping were used on husband-centred and family-centred strategies. 2. hospitalisation: coping strategies were mainly illness-focused (behavioural & cognitive), emotion-controlled (intrapsychic), seeking support (behavioural & intrapsychic), and strategies which could reduce threat, e.g. planning for the future, hoping (behavioural & cognitive) or avoidance (intrapsychic). 3. 12-months post-MI: spouses used behavioural coping (monitoring husbands' diet, activity and medication) and cognitive coping (maintaining a stable and calm environment without upsetting the husbands) to look after their husbands. Wives also used help-seeking to deal with husbands' treatment. Emotional support need and denial were greatly diminished. 4. Older wives and wives with occupation reported to cope better than younger wives or those without a job.
Miller & Wikoff (1989)	40 spouses	3-months post-MI	Survey (The Jalowiec Coping Scale, JCS, 1984)	Spouses used various coping strategies. Confrontive coping was used most frequently, with the use of palliative and emotive coping following in order. The less use of emotive coping, the greater level of marital functioning.

Due to the differences between measuring tools and administration times, it is difficult to conclude what specific coping strategies MI patients' spouses used. However, Table 5.3 indicates that MI spouses also used a variety of strategies to deal with the MI event. When MI patients were hospitalised, most of their spouses concentrated on treatment-related problems, seeking support and dealing with their own emotions. These studies also reflected that the spouses' age and working status positively correlated with their coping results. Finally, although only a few studies examined coping strategies and MI spouses' psychological wellbeing, Miller et al. (1989) reported that MI spouses' "emotive coping" negatively correlated with their marital functioning. This echoed with the findings that MI patients' use of emotion-focused coping after hospital discharge negatively correlated with their own psychological wellbeing.

5.5. The relationships of couples' responses to MI

Section 5.5 focuses on two topics: the comparison of MI couples' illness perceptions and the correlations between their emotions, social support and coping strategies.

5.5.1. MI couples' illness perceptions

Previous reviews have indicated a consistent finding - MI events significantly correlated with spouses' psychological and physical health. However, little is known about whether the spouses' perceptions of MI may influence the patients' recovery. Schroder and Schwarzer (1997) examined heart surgery patients' quality of life and their spouses' characteristics. They found that spouses' perceived support and self-efficacy partly predicted the patients' returning to normal life in six months after surgery. This study makes one wonder whether the spouses' perceptions of MI may also influence the patients' recovery.

Only four studies examined couples' illness perceptions of MI. Billing et al. (1997a) used interviews and Q-sort methodology to elicit patients', spouses' and their physicians' causal attributions of MI before the patients' hospital discharge. The results indicated that in general, the MI couples attributed to similar causes and expected similar outcomes, but the patients and their physicians had a lower level of agreement, as the MI patients agreed more on 'social' and 'psychological' causes while the physicians relied more on medical explanations. They also found that the MI spouses' attributions

were influential on the patients' making changes at work, exercise test results, and the patients' physical, social and sexual functioning.

Weinman et al. (2000) examined first-time MI couples' causal attributions. Patients' causal attributions were measured during hospitalisation and at 6-month post-MI, and the spouses' causal attributions were measured at the 12-weeks post-MI. They found that 'stress', 'heredity', and 'eating fatty foods' appeared to be on both MI couples' top lists. After factor analyses, the 84 couples still shared similar opinions on 'stress' and 'lifestyle' causes. However, while the patients attributed 'heredity' to one MI cause, the spouses regarded 'family distresses' as the third main causal component. In general, there was close agreement in the most important attributions when these causes were ranked by the MI couples separately. An important finding was that spousal attributions to 'poor health habits' were associated with the improvements of the patients' exercise level at six months. However, because the spouses' causal attributions were not measured during patients' hospitalisation, conclusions regarding its stability and predictive power could not be drawn.

Questioning the analysis method of Weinman et al. (2000), French et al. (2005b) re-analysed their study by controlling the patients' pre-MI health behaviours. The re-analysed results showed that patients' causal attributions did not significantly predict health behaviours. However, the spouses' causal attributions became important, as the spouses' 'stress attribution' and 'lifestyle causes' were associated with the patients' exercise behaviour and/or smoking reduction. In addition, French et al. (2005b) also repeated a similar study by using another group of English MI couples. They found that before controlling pre-MI behaviours, the patients' "lifestyle causes" predicted their exercise behaviour at 6-month post-MI and the spouses' 'lifestyle' and 'family distress' causes both predicted the patients' dietary behaviour. However, once pre-MI behaviour was controlled for, none of the patients' causal attributions predicted their behavioural changes, but the spouses' 'family distress' causes did predict the patients' dietary behavioural change.

5.5.2. First-time MI couples' emotions, social support and coping

This section reviews MI couples' emotional responses, social support and coping strategies together. Table 5.4 presents previous studies that compared the MI couples' distress, social support needs and coping.

Table 5. 4. Comparisons of first-time MI couples' emotions, social support and coping

Authors	Sample (couples)	Administration	Measures	Emotions	Social support	Coping
Hilbert (1985)	60	Cross-sectional: 3-months to 17-years post-MI	Patient: The Compliance Questionnaire (Johnson, 1974) Spouse: The Spouse Support Questionnaire (self-design)	X	Spouses' social support did not predict the patients' compliance	X
Fiske et al. (1991) Coyne & Smith (1991) Coyne & Smith (1994)	56	Cross-sectional: 6-months post-MI	Patient (husband): Self-efficacy , functional disability, changes in closeness, pre-MI marital quality, dependence of patient self-efficacy on the wife, life satisfaction, & coping (self-designed questionnaires), distress (Hopkins Symptom Checklist, HSCL-25, Derogatis et al., 1974) Spouse (wife): self-efficacy, hostility, over-protectiveness, discussion about the heart attack, burden, changes in closeness, dependence of patient self-efficacy on the wife, life satisfaction & coping (self-designed questionnaires), psychological distress (HSCL-25), contact with the medical system & quality of information, pre-MI marital quality,	Patient: spouse's hostility was associated with patient's low self-efficacy and higher psychological distress Spouse: patient's age and income were negatively correlated with spouse's distress, but patient's functional disability, protective buffering coping (e.g. hiding anger), and spouse's own protective buffering coping were positively correlated with spouse's distress.	Couple: spouses' over-protectiveness was related to the couple's becoming closer after the MI event	Couple's coping: spouse's hostility was associated with the couple's getting more distant and having fewer useful discussions about coping Patient: their self-efficacy was positively correlated with patient/spouse life satisfaction, information adequacy, marital quality, wife's self-efficacy in dealing with the MI. Their self-efficacy was negatively correlated with their protective buffering of the wife, patient/spouse distress, spouse's burden, and spouse' functional impairment. Spouse: spouse's protective buffering of patients has a negative effect on their own coping
Thompson et al. (1995)	20	Cross-sectional: 1-month post-MI	Patient(husband): interview Spouse (wife): interview	Patient: most of the patients felt positive and could exert some control over their health by modifying their behaviour and wanted to go back to normal. Spouses: the partner faced two issues – the MI event and the partner's behaviour in relation to the patient. Spouses suffered a significant emotional upset (anxiety and tearfulness).	The couples both had a significant need for advice and information. They prefer physicians and it maybe better to talk to couples separately sometimes instead of together	Patient: although patients may feel positive, they also tried to use denial to diminish the threat caused by the heart attack. Couple: It seemed that the couple's relationship might be enhanced through them 'coming together' in adversity.
Clarke et al. (1996)	52	Longitudinal: 1. In hospital, 2. 3-months post-MI	Patient (husband): 1. Hospitalisation: including interview, Family APGAR (Smilkstein, 1978), cardiac self-efficacy scale (Taylor et al., 1985). 2. 3-months pos- MI: including Family APGAR, self-efficacy, Zung depression & anxiety Scale (Zung, 1965), Perceived over-protectiveness & criticism (Psychosocial Adaptation to Illness Scale, Derogatis & Derogatis, 1990), Influential Relationships Questionnaire (Baker et al., 1984), Goldman Specific Activity Scale (Goldman et al., 1981). Spouse (wife): 1. Hospitalisation & 3-months post MI: including a family APGAR, expectation of patient's self-efficacy, Zung's depression & anxiety scale.	Patient: 1. 3-months post-MI depression & anxiety were positively correlated with in-hospital distress. Anxiety & depression were correlated. They were also positively correlated with patients' perceived over-protectiveness. Spouse: 1.Spouses' 3-months post-MI anxiety & depression were positively correlated with the same mood during hospitalisation.	Patient: 1. 3-month Perceived over-protectiveness was positively correlated with patient's perceived criticism from their wives. But over-protectiveness was negatively correlated with optimism & perceived caring. Spouse: Spouses who were perceived as over-protective were less optimistic about their husbands' functional recovery immediately.	Patient: 1. Perceived criticism from their wives was negatively correlated with patient's quality of life. 2. Over-protectiveness also negatively correlated with patients'/spouses' expectation of patients' functional abilities in 3 months from baseline.

Note: APGAR: A = adaptation; P = participation ; G = growth/gain; A = affection; R = resources

(Continued)

Authors	Sample (couples)	Administration	Measures	Emotions	Social support	Coping
Rose et al. (1996)	30	Longitudinal: 1. 4-weeks post-discharge. 2. 10, 16, 22 weeks post-discharge	For both patients & spouses: Each time they were asked to fill in psychological distress & adjustment (Hopkins Symptom Checklist, HSCL, Derogatis et al., 1974); cardiac symptoms, marital satisfaction & functional impairment (Michigan Family Heart Questionnaire, Coyne et al., 1990); activity (Biernat &Wortman, 1991)	1. By 10-weeks post-discharge, patients were less distressed than spouses. By 16 weeks, both groups' distress levels were diminished to the same. There was no gender effect.	Male spouses increased domestic activities in the weeks shortly after their wives' heart attack. Although the female patients decrease the domestic activities, they still did as much as their husbands. Male patients performed less domestic activities at all times.	X
Suls et al. (1997)	43	Longitudinal: 4-weeks & 6-months post-discharge	Patient (husband): psychological distress (HSCL-25); cardiac symptoms & marital satisfaction (Michigan Family Heart Questionnaire, Coyne et al., 1990); Protective Buffering Coping (Coyne, 1991) Spouse (wife): psychological distress, marital satisfaction, protective buffering coping	Patient: 1. 4 weeks – patient's distress was positively correlated with cardiac symptoms, using more protective buffering coping, their wives were more distressed and used more protective buffering coping. Less educated patients were more distressed at the same time. 2. 6 months – patient's distress was positively correlated cardiac symptoms, spouse's distress, patient's protective buffering at the same time. 3. patient's 6-month distress was also positively correlated with 4 week patient's cardiac symptom, protective buffering & distress, 4 week spouses protective buffering and distress, & negatively correlated with 4 week patient's martial satisfaction. Spouse: 1. 4 weeks – wife's distress was positively correlated with patient's distress, and spouse's protective buffering coping. But it negatively correlated with patient's age and spouse's marital satisfaction at the same time. 2. 6 months – spouse's distress was positively correlated with spouse's protective buffering and patient's distress. But it negatively correlated with patient's marital satisfaction at the same time. 3. Spouse's 6-month distress was positively correlated with spouse's 4-week protective buffering & distress. But it negatively correlated with spouse's 4-week marital satisfaction.	X	Patient & spouse: 1. 4 weeks – the engagement of patient's & spouse's protective buffering was negatively correlated with patient's marital satisfaction, but positively correlated with patient/spouse distress. Spouse alone: 1. 4 weeks – spouse's use of protective buffering was positively related to patient's cardiac symptoms and patient's protective buffering. 2. 6 months – spouse's use of protective buffering was negatively correlated with spouse's & patient's marital satisfaction.

Note: APGAR: A = adaptation; P = participation ; G = growth/gain; A = affection; R = resources

(continued)

Authors	Sample (couples)	Administration	Measures	Emotions	Social support	Coping
Turton (1998)	18 (& 18 CCU nurses	Cross-sectional: 2-weeks post-discharge	Cardiac Patient Learning Needs Inventory (CPLNI, Gerard, 1976; Gerard & Peterson, 1984)	X	1. In terms of informational support needs, it was found that 'symptom management' and 'life-style factors' were the most important two categories for all three groups. 2. There was no significant difference between patients and spouses in any information category. 3. The significant difference between patients and nurses was related to 'activities' & 'drug information'. The significant difference between spouses and nurses was 'dietary information'.	X
Stewart et al. (2000)	14	Longitudinal: 1-month post-discharge & lasted for 12 weeks	interview	X	1. Participants reported family, friends, and faith in God were sources of emotional support. 2. Physicians and nurses were mainly informational support providers. 3. Instrumental support was seldom mentioned. 4. Some survivors exhibited negative reactions to spouses' over-protectiveness or misplace. Besides, health professionals were often perceived to be non-supportive. 5. Spouses perceived to lack informational and emotional support.	Survivors and spouses used diverse emotion-focused, problem-focused and relationship-focused strategies to cope with MI: Emotion-focused: e.g. adjusting expectations, denial. Problem-focused: e.g. seeking for information. Relationship-focused: e.g. active engagement, communication, protecting partner.
Webster et al. (2002)	35	Cross-sectional: 1-month post MI	interview	X	Both groups reported lack of information and advice from the hospital and GP. The family was the main source of support	Respondents reported to have poor expectations, lacking future plans and believe in fate. They only had little lifestyle adjustment

Note: APGAR: A = adaptation; P = participation ; G = growth/gain; A = affection; R = resources

Five studies used cross-sectional design and the administration time varied from one month to 17 years post-MI. Another five studies used longitudinal-design and followed participants up to six months. Of these ten studies, three used a qualitative approach.

Only two studies examined the correlation between MI couples' emotional responses. Results from Fiske et al and Coyne et al. (1991, 1994) showed that the MI spouses' hostility positively correlated with the patients' high distress. MI patients who were younger, who had a low income, who had a high level of disability and who were trying to protect their spouses tended to have spouses with higher levels of distress. Suls et al. (1997) reported that male MI patients' distress positively correlated with their wives' 'distress' and 'using more protective buffering' at the same time and over time. The wives' distress positively correlated with the male patients' distress but negatively correlated with the patients' age and marital satisfaction at the same time. Although both studies only used male MI patients, these findings indicate that the characteristics of MI couples have influences on each other.

In terms of social support, two key issues emerged from seven studies: '*support needs*' and '*over-protectiveness*'. Overall, both MI couples strongly felt the needs for information support from health professionals. There was no significant difference in the ranking of information needs between MI couples. However, there were different priorities between MI patients and cardiac nurses. In addition, there were some conflicting findings. For example, 'over-protectiveness' was found to positively correlate with the couples' closeness in one group (Fiske et al., 1991, 1994) and negatively correlated with MI patients' perceived caring, quality of life and optimism in another group (Clarke, 1996). The wives who were perceived as over-protective by their husbands were less optimistic about their husbands' functional recovery.

Finally, the main concern of coping between first-time MI couples was the use of "protective buffering". These studies showed that "protective buffering coping" did not benefit MI couples. The use of "protective buffering" not only positively correlated with couples' distress, but also negatively correlated with couples' marital satisfaction.

5.6. Conclusion

This chapter reviewed the emotional responses and illness perceptions of MI patients' spouses, in addition to the couples' responses when facing an MI together. In general,

the spouses of MI patients had strong negative emotions towards the MI and felt in great need of informational support from medical professionals during patients' hospitalisation. In addition, although no definite conclusion could be made, some of the reviewed studies have shown that MI couples' emotions, illness perceptions, social support and coping strategies play important roles on patients' or partner's wellbeing. However, many of these reviewed studies recruited only male MI patients and female spouses and some had a very small sample of participants.

CHAPTER SIX - RESEARCH AIMS AND HYPOTHESES

The main themes of this chapter focus on study aims and research hypotheses, which are described in section 6.1 and 6.2.

6.1. Research aims and research questions

The first five chapters have reviewed literature regarding first-time MI patients' and their spouses' emotional responses, illness perceptions, coping strategies and social support. The review evidence indicated that an MI event is a dramatic experience to patients and their family. Not only MI patients felt depressed and anxious during hospitalisation, their spouses also tended to report similar negative feelings. In some studies, MI spouses even reported higher levels of depression or distress than the patients did (Rose et al., 1996; Thompson et al., 1995).

Reviews also indicated that MI patients' perceptions of their illness could influence their moods. For example, those who held the idea that their MI would bring them serious consequences tended to report more distress (Figuerias & Weinman, 2003). Other evidence also suggested that social support and coping strategies correlate with MI patients' moods. Those who reported higher level of perceived support tended to be less depressed. Problem-focused coping strategies also linked with less depression and anxiety.

Although each of these factors all link with MI patients, the role of social support and coping in relation to illness perceptions and moods remained unexplored. In order to understand the overall impacts of these factors on first-time MI patients, one main aim of this study was to examine how illness perceptions, social support, and coping influence first-time MI patients' moods during the first six months post-MI. Another main aim was to examine the same variables on first-time MI couples' moods. Overall, five research aims were established for this study:

- To study MI patients' emotional responses during hospitalisation and during the first six months, with particular reference to anxiety and depression
- To study patients' perceptions of MI during hospitalisation and during the first six months post-MI

- To explore the relationships of post-MI illness perceptions, social support and coping strategies on moods
- To investigate couples' emotional responses and illness perceptions when one of them has an MI
- To explore the relationships of post-MI couples' illness perceptions, social support and coping on moods

To achieve these aims, a number of research questions were formulated as follows –

1. What were first-time MI patients' emotional responses and illness perceptions during their hospitalisation and with the first six months?
2. What were the roles of illness perceptions, social support and coping strategies in relation to MI patients' moods during the first six months?
3. Was there any mediator in the Common Sense Model of illness, between illness perceptions and moods?
4. What were couples' emotional responses and illness perceptions toward patients' MI?
5. Would MI couples influence each other's moods?

6.2. Research hypotheses

Based on the research questions in section 6.1, a number of research hypotheses were generated:

Research question 1: What are MI patients' emotional responses and illness perceptions during their hospitalisation and within the first six months?

The exploration of MI patients' emotional responses and illness perceptions was conducted while they were treated in hospital and no specific hypotheses were formulated. However, three hypotheses were raised to answer the second part of question one.

H1: MI patients' depression and state anxiety will decrease from hospitalisation to six months post MI.

H2: Those patients who are depressed (using a cut-off score = 16 for the CESD, Radloff, 1977) during hospitalisation will be more likely to be still depressed at 6-month post-MI.

H3: MI patients' belief that an MI will bring serious consequences will lessen over the first six months.

Research question 2: What are the roles of illness perceptions, social support and coping strategies in relation to MI patients' moods during the first six months?
To examine the roles of illness perceptions, social support and coping on MI, three sets of hypotheses were generated.

Illness perceptions and post-MI moods
H4: Those patients with strong perceptions that their MI will bring serious consequences would be more depressed and anxious.
H5: Those patients who believe they cannot control their MI would be more depressed and anxious.
H6: Those patients who believe their illness will last a long time would be more depressed and anxious.
H7: The correlation patterns between patients' illness perceptions and post-MI moods will be similar at each assessment.
H8: Patients' illness consequence perception will contribute more to moods than social support and coping.

Social support and post-MI moods
H9: At 4-8 weeks and 6-month post-MI, patients' social support will significantly increase the prediction of the variance of moods.
H10: Patients' desired support and the difference between perceived available and desired support will predict their depression at 4-8 weeks and 6-months post-MI.

Coping strategies and post-MI moods
H11: MI patients who use more problem-focused coping strategies (i.e. active coping, planning, positive reframing, acceptance and seeking instrumental support) will report less depression and anxiety after hospital discharge to 6-month post-MI.
H12: The adding of coping strategies to illness perceptions will significantly increase the explanation of variance of post-MI patients' moods.

Research question 3: Was there any mediator from the Common Sense Model of Illness (CSMI), between illness perceptions and moods?

As social support is regarded as part of coping resources (Thoits, 1986), and coping procedure is regarded as part of the adaptation when one faces an illness, it was hypothesised that –

H13: Perceived total support would mediate the perception of 'illness consequences' and post-MI depression.

H14: 'Denial' coping strategy would mediate 'illness control' perception and post-MI depression.

Research question 4: What were couples' emotional responses and illness perceptions toward patients' MI?

To explore MI couples' responses, no specific hypotheses were made.

Research question 5: Would MI couples influence each other's moods?

H15: MI couples' moods, in particular depression and anxiety will positively correlate.

H16: Those couples who both believe that an MI will bring the patients serious consequences will be more depressed and anxious than those couples who do not believe so.

H17: For MI patients who have a spouse, their marital satisfaction will mediate their perceived social support on their depression and anxiety.

CHAPTER SEVEN – METHODOLOGY

This chapter describes the methods used in this study, including psychological measurement scales, procedures and statistical analyses of the data. The reliability of all measures is presented in Appendix A-8.

7.1. Description of measures

Before describing the details of each measure, Table 7.1 summarises the questionnaires used in this study.

Table 7. 1. Summary of questionnaires used in the current study

Measures	Time 1 (3rd-5th day in hospital)	Time 2 (4-8 weeks after MI)	Time 3 (6th month post MI)
Psychological wellbeing -			
1. Depression (depressive symptoms)	♠ Δ	♠ Δ	♠ Δ
2. State anxiety	♠ Δ	♠ Δ	♠ Δ
3. Positive and negative affect	♠ Δ	♠ Δ	♠ Δ
Illness representations	♠ Δ	♠ Δ	♠ Δ
Social support -			
1. Types and total support	---	♠ Δ	♠ Δ
2. Perceived & desired support	---	♠ Δ	♠ Δ
Coping strategy	---	♠ Δ	♠ Δ
Other information			
1. Marital satisfaction	---	♠	---
2. Co-morbidity	---	♠	♠
3. Demographic /medical data	♠ Δ	---	---
4. Attendance to rehabilitation	---	---	♠

♠ patients Δ partners/spouses

7.1.1. Outcome measures – psychological wellbeing (moods)

Psychological wellbeing was operationalised by measuring depression (depressive symptoms), state-anxiety, and positive/negative affect. As reviewed before, depression and state anxiety are one of the focuses of MI research. It has also been found that state anxiety, negative affect and low positive affect were related to depression (Clark, 1989; Brummett et al., 1998; Watson et al., 1988). To broaden mood dimensions, the State-Trait Anxiety Inventory (STAI, Spielberger et al., 1983ab) and the Positive and Negative Affect Scale (Watson et al., 1988) were also included.

Although many earlier studies used the Beck Depression Inventory (BDI) (Beck et al., 1961) to measure depression, BDI was not used in this study as it contains several items related to somatic symptoms, which may confound some symptoms of physical illness, i.e. MI. Therefore, the Centre for Epidemiological Studies Depression-Scale (CESD; Radloff, 1977) was used to investigate depression.

7.1.1.1. Depression (depressive symptomatology) – Centre for Epidemiological Studies Depression-Scale (CESD) (Radloff, 1977).

A. Background

The CESD is a self-report scale used for general population studies to measure the presence and severity of depressive symptoms. The items categorise different components of the symptoms (depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite and sleep disturbance). Further advantages of using the CESD are that

- This instrument was designed to measure depressive symptoms, including cognitive and affective symptoms in the general population. Unlike the BDI (Beck et al., 1961) and Zung's self-rating depression scale (Zung, 1965), the CESD avoids somatic statements related to symptoms which may be actually caused by physical problems. Although the BDI and Zung's self-rating depression scale are popular, they were mainly designed to measure depression in clinical psychiatric settings, but not milder levels of depression or depressive symptoms which may be more commonly experienced by cardiac patients (Roberts et al., 2001).
- Sharpe & Gilbert (1998) suggested that, after repeatedly measuring depression score, the CESD only shows minor potential reactive effects when it is compared with other popular depression scales like the BDI (Beck et al., 1961), Zung's self-rating depression scale (Zung, 1965), and the Profile of Mood States (POMS; McNair et al., 1971). The CESD has also been used with MI patients (Taylor et al., 1998) with good reliability and validity. .
- The Hospital Anxiety and Depression Scale (HADS, Zigmond & Snaith, 1983) has also been used to measure cardiac patients' depression (Bakalis & Bundy, 2001; Bennett et al., 1999ab; Brink et al., 2005; Martin et al., 2000, 2003;

Mayou et al., 2000; McGowan et al., 2004; Roberts et al., 2001; Thornton & Hallas, 1999; Yohannes et al., 2007). However, attempts to evaluate its psychometric properties among cardiac patients were shown that the HADS may represent the two factors (anxiety and depression, Roberts et al., 2001), while others have found three factors (depression, trait anxiety and state anxiety, Martin et al., 2000, 2003), with depression and anxiety correlated at 0.60 (Roberts et al., 2001). As the CESD does not have similar problems, it was decided to use the CESD instead of the HADS to assess depression.

B. Development and design

This questionnaire contains 20 statements and the respondents are asked to indicate the frequency of occurrence of each symptom in the past week. Therefore, the test-retest reliabilities are not expected to be high. Its criterion group validity was supported by its success in discriminating between the general and psychiatric populations when using a score of 16 as the cut-off point (Radloff & Locke, 1986). It shows good concurrent validity when compared with other indices of severity of depression. Several researchers also reported four main factors can be extracted from the CESD ('depressed affect' - item 3, 6, 14, 17 & 18; 'positive affect' - item 4, 8, 12 & 16; 'somatic and retarded activity' - item 1, 2, 7, 11, & 20; 'interpersonal difficulties' - item 15 & 19; Davidson et al., 1994; Devins, et al., 1988; Gatz & Hurwicz, 1990; Hertzog et al., 1990; Knight et al., 1997; Radloff, 1977; Williamson & Schulz, 1992; Zich et al., 1990).

C. Questionnaire modification

(1). Questions for patients

For patients, the instruction during their hospitalisation was modified from the standardised instruction "...how often you felt or behaved this way **during the past week**" to "...how often you felt or behaved this way **since your heart attack**". At the two follow-up assessments, the standardised instruction was applied.

(2). Questions for spouses

For spouses, the wording during patients' hospitalisation was changed from the standardised instruction "...how often you felt or behaved this way **during the past week?**" to "...how often you felt or behaved this way **since your partner's heart attack?**". The standardised instruction was applied at the two follow-up assessments.

D. Scoring

Both patients and spouses rated the frequency of each symptom on a four-point Likert scale ranging from 0 = "rarely or none of the time (less than one day)" to 3 = "most or all of the time (5 to 7 days)." Items 4, 8, 12, and 16 were reverse scored. The total scores ranged from 0 to 60. Higher scores indicated more severe depression, and the score of 16 was used as the cut-off point for separating normal and possible depression.

7.1.1.2. State anxiety – A short form of State-Trait Anxiety Inventory, state form (STAI-S, Spielberger et al., 1983ab; Marteau & Bekker, 1992).

A. Background

The original STAI test consists of two scales: the state and the trait anxiety scales. Each contains 20 items. State anxiety is an acute, unpleasant arousal when one faces threatening situations. Trait anxiety indicates the stability of individual tendency to respond with state anxiety when anticipating threatening situations (Lazarus, 1991; Schwarzer, 1990). For patients who have anxiety disorder, the trait scale is normally used as it measures four categories – excessive worry, tension, low self-esteem (feeling not good enough or even worthless), and feeling demoralized (feeling cannot be bothered to do anything as it won't be done properly) (Fisher & Durham, 1999; Spielberger et al., 1983).

Both types of anxiety contain *'worry'* and *'emotionality'* components (Spielberger, 1980). *Worry* is the cognitive part of the anxiety experience when individuals appraise and feel the danger or incompetence in the face of threats. *Emotionality* refers to the arousal part of the anxiety experience like sweating and shaking.

B. Development and design

In this study, a short form of the STAI-S (Marteau & Bekker, 1992) was used to assess state anxiety. This short STAI-S selected six items of the original STAI-S. It has high correlation with the original STAI–S and is very sensitive to fluctuations in state anxiety, with the internal reliability coefficient alpha reaching 0.82. Lowe et al. (2000) had used it to measure MI patients.

C. Questionnaire modification

There was no modification in this short STAI-S and standardised instruction was used for both patients and spouses on each assessment.

D. Scoring

The short STAI-S is a four-point scale ranging from 1 = "not at all" to 4 = "very much". Item number 1, 4 & 5 were reversed and the total score ranged from 6 to 24. High scores indicated a high level of state anxiety. As the short-form STAI-S was highly correlated with the full-form STAI-S, to compare with other studies used full-form STAI-S, the total score of short STAI-S was divided by six and then times 20 to get a total score of original STAI-S which ranged from 20 – 80.

7.1.1.3. Positive and negative affects – Positive and Negative Affect Scale (PANAS, Watson et al., 1988)

A. Background

The PANAS aimed to measure individuals' general psychological distress and the presence/absence of pleasant experiences. Positive affect (PA) and negative affect (NA) are suggested to be two independent dimensions (Egloff, 1998). Positive affect (PA) reflects the extent to which a person feels alert, enthusiastic and active. Negative affect (NA) reflects the general dimension of subjective distress and unpleasant engagements. It contains a variety of aversive mood states including fear and nervousness (Watson et al., 1988).

B. Development and design

The 20-item self-administered PANAS was modified from the 60-item PANAS-X scale (Zevon & Tellegen, 1982). Each affective dimension contains ten adjectives. Respondents rate their feelings and indicate the extent by describing their own feelings on a five-point scale.

The reliability and validity of PANAS were reported by Watson et al. (1988). Internal consistency on large samples of college students exceeded 0.84 for the timeline of 'past

few days' and 'past few weeks.' Factorial validity and external validity was confirmed. It was used in different populations including coronary artery disease patients (Sullivan et al., 2001).

C. Questionnaire modification

(1). Questions for patients

During hospitalisation, patients indicated to what extent "...you have felt this way since your heart attack." For the two follow-up assessments, patients were asked to rate to what extent "you have felt this way during the past week."

(2). Questions for spouses

During patients' hospitalisation, spouses were asked to report to what extent "you have felt this way since your partner's heart attack?" As for the two follow-up assessments, spouses were also asked to rate to what extent "you have felt this way during the past week?"

D. Scoring

The PANAS uses a five-point Likert scale ranging from 1 = "very slightly or not at all" to 5 = "extremely." The scores were derived by adding item scores (1 to 5) to the ten PA adjectives to obtain the PA score, and the other ten adjectives for the NA score. Both total PA and total NA scores range from 10 to 50. The higher the score, the stronger PA or NA the respondent had experienced. The reported mean for the norms were 33.3 ± 7.2 (PA) and 17.4 ± 6.2 (NA) for the "past few days" and 32.0 ± 7.0 (PA) and 19.5 ± 7.0 (NA) for "past few weeks".

7.1.2. Illness perceptions – Illness Perception Questionnaire (IPQ, Weinman et al., 1996)

A. Background

Based on the theory of self-regulation and the cognitive model of illness representations (Leventhal et al., 1980, 1984), the IPQ was designed to measure the proposed five

illness perception components – illness symptoms, illness causes, illness timeline (length of illness), illness consequences, and its control/cure (Weinman et al., 1996).

B. Development and design

An MI version of the IPQ (Weinman et al., 1996; Petrie & Weinman, 1997) was used in the current study. The psychometric properties of IPQ has been assessed by the questionnaire designers by using different groups of patients with MI, rheumatoid arthritis, diabetes, renal failure, asthma, chronic fatigue syndrome, and chronic pain. These reports have shown good levels of internal consistency, test-retest reliability and concurrent validity on a group of MI patients.

Fifteen items were used to measure 'symptom perceptions' - fatigue, nausea, breathlessness, chest pain, tightness in the chest, upset stomachs, sore eyes, sleep difficulties, dizziness, difficulty concentrating, irritability, stiff or sore joints, headaches, loss of strength, and dry mouth. The causal attribution subscale contains 24 items which were summarised by Petrie & Weinman (1997) after referring to the recent studies of attributions following MI (Affleck et al., 1987a; de Valle & Norman, 1992), and they identified three factor components (*lifestyle, stress, and heredity*). Finally, thirty items were used to measure timeline, cure/control and consequence beliefs. Petrie and Weinman (1997) did not specifically categorise these 30 items into three subscales to fit the three components. Therefore, in the current study, principal component analysis was applied and five sub-components were extracted: *physical consequences*, *emotional consequences*, *timeline*, *active control* and *passive control* (see chapter 8 for further results).

C. Questionnaire modification

In order to examine individual patient's and spouse's illness perceptions, the IPQ was administered to both groups on all three occasions but with different instructions for each group.

(1). Questions for patients

Patients were asked to rate the frequency of each symptom they experienced from four categories: 'all of the time', 'frequently', 'occasionally', and 'never'. In terms of causes, timeline, consequences, and cure/control components, patients were instructed to indicate to what extent they agreed or disagreed with each statement, ranging from '5 = strongly agree' to '1 = strongly disagree'.

(2). Questions for spouses

Spouses rated how often each symptom was observed by themselves as part of the patient's heart complaint from four categories: 'all of the time', 'frequently', 'occasionally', and 'never'. For the causal attribution subscale, spouses were instructed to rate the 24 items from a five-point scale on how likely each one was to have caused the patient's MI. The five-point scale ranges from 1 = "strongly disagree" to 5 = "strongly agree."

Regarding illness timeline (duration), consequences and cure/control perceptions, five statements (item NO. 2, 3, 10, 12 & 16) were modified for the spouses. Because the researcher was interested in exploring the role of spouses on patients' recovery, and how an MI event might influence spouses' illness perceptions, coping and moods, these five statements were modified to reflect the impacts of the MI event on the spouses' life, rather than the impacts on the patients' life. Table 7.2 lists the modified statements, and column 1 and column 3 list the items used in the current study.

Table 7. 2. Descriptive differences on MI couples' IPQ

Patient (used in this study)	Spouse's perceptions of what might happen to/or influence the patients after their heart attack (not used in this study)	Spouse's perceptions of what might happen to/or influence themselves after the MI event (used in this study)
2. The symptoms of my heart problem are distressing to me	The symptoms of my partner's heart problem are distressing to him/her	**The symptoms of my partner's heart problem are distressing to me**
3. The symptoms of my heart problem are puzzling to me	The symptoms of my partner's heart problem are puzzling to him/her	**The symptoms of my partner's heart problem are puzzling to me**
10. My illness has had major consequences on my life	My partner's illness has had major consequences on his/her life	**My partner's illness has had major consequences for my life**
12. My illness has not had much effect on my life	My partner's illness has not had much effect on his/her life	**My partner's illness has not had much effect on my life**
16. My illness has strongly affected the way I see myself as a person	My partner's illness has strongly affected the way I see him/her as a person	**My partner's illness has strongly affected the way I see myself as a person**

(3). Perception of future MI threat

To examine patients' and spouses' threat of future MI, one self-designed question was added. At each assessment both patients and their spouses were asked their views on the probability of the patients having another heart attack on a five-point Likert-type scale ranging from 1 = "highly unlikely" to 5 = "highly likely."

D. Scoring

Two methods were used to code the symptom subscale. The first added the number of items endorsed at "occasionally" or greater. In this way, the total score ranged from 0 to

15 for this subscale. The second method rated 0 = "never", 1 = "occasionally", 2 = "frequently" and 3 = "all the time" and added the whole 15 items. The total score ranged from 0 to 45 for the second method.

Based on the IPQ authors' advice (Petrie & Weinman, 1997), each response to a cause indicated a specific and unique meaning; the 24 causal attributions were not summed up to obtain a total score. Besides, as Petrie and Weinman (1997) also used factor analysis to extract three factor components (*lifestyle*, stress, *heredity*), this study followed this procedure and the same method was used to check whether the same factors would be generated. The results revealed three similar causal components: *"stress"*, *"uncontrollable/external causes"*, and *"unhealthy lifestyle/behaviour"*. The mean score of each causal component was calculated (See Chapter 8 for details).

In terms of illness timeline (duration), illness consequences and cure/control subscale, items 5, 7, 11 & 12 were reverse coded. Factor analysis generated five factors: *"physical/external consequences"*, *"emotional consequences"*, *"timeline"*, *"active coping"*, *and "passive coping"*. The mean score of these five factors was used.

Except for the *"active control" perception*, the higher the mean score, the stronger the respondents believed in negative or serious impacts of the MI event (Chapter 8).

7.1.3. Social support – Multidimensional Scale of Perceived Social Support (MSPSS, Zimet et al., 1988)

A. Background

Although there have been different suggestions about the definition of social support, it is agreed that basically social support can be divided into three types according to its functions: emotional, instrumental and the provision of information. It has also been suggested that perceived social support is more important to health than actual received social support. Although social networks are another main focus, this is seldom measured in conjunction with other types of support.

B. Development and design

The MSPSS was designed to measure different types of social support the respondents perceived from three different support providers: 'significant other', 'family', and 'friends'. It contains 12 items, which not only measure the support sources but also support types. Past studies have confirmed that MSPSS has good internal consistency reliability, test-retest reliability and sub-scale validity. (Irvine et al., 1999; Kazarian & McCabe, 1991; Stanley et al., 1998) It has been proved applicable across different cultures (Eker & Arkar, 1995), and it has been applied to different groups, including MI patients (Frasure-Smith et al., 2000ab).

C. Questionnaire modification

(1). MSPSS: In order to minimise the possible immediate impacts of an MI event on patients' perceived social support, MSPSS was measured at the second and third assessment only. Both MI couples were asked to rate the support they perceived from friends, family and one significant other on a seven-point scale ranging from 1 = "very strongly disagree" to 7 = "very strongly agree."

(2). Two self-designed Visual Analogue Scales

At the second and third assessment, two 10-centimetre visual analogue scales were added to measure *a. how much support the respondents (including patient and spouse) felt available*, and *b. how much support they would like to receive*. These two scales had the label of 'no support at all' at the left end and the label of 'lots of support' at the right end. Participants were asked to put a cross on these two lines to indicate the level of support available and desirable.

D. Scoring

(1). MSPSS - The total perceived support was obtained by adding up all 12 items. The total social support from a special one (items NO. 1, 2, 5, 10), from family (items NO. 3, 4, 8, 11), and from friends (items NO. 6, 7, 9, 12) were also obtained from adding different items. The higher the score, the more perceived social support a respondent felt.

(2). Perceived available support and desired support - These two scores were calculated by measuring the length from the left end to the centre of the cross (in centre meter) and then multiplied by 10 for each item. Besides, the percentage of perceived

available support vs. desired support, and the difference between these two scores (perceived available support minus desired support) were also calculated.

7.1.4. Coping – The Brief COPE (Carver, 1997)

A. Background

The starting point for research on coping is the conceptual analysis of stress and coping offered by Lazarus in 1966 (see also Lazarus & Folkman, 1984). In Folkman & Lazarus (1988ab) 'Ways of Coping Scale, coping was defined as two types: 'emotional-focused coping' and 'problem-focused coping'. However, Carver et al. (1989) proposed that this dichotomy was too simple and different coping strategies should be measured separately. Therefore, the full COPE was designed with fifteen separate dimensions. The review in Chapter 3 suggested that the COPE is probably the most suitable scale for measuring coping strategies due to its good properties as well as allowing researchers to measure situational and dispositional coping strategies. However, considering the full-scale COPE contains 60 items, a brief COPE, which was modified by the same author (Carver, 1997) was used in the current study. The reliability of this questionnaire in the current study was 0.84 and 0.85 for patients at the second and third assessment, respectively (Appendix A-8).

B. Development and design

The 28 items in the brief COPE were categorised into 14 conceptually differential coping reactions: active, planning, positive reframing, acceptance, using instrumental support, denial, venting, substance use, behavioural disengagement, self-blame, using emotional support, self-distraction, humour and religion (Table 3.13). The first five are generally regarded as adaptive. 'Denial' to 'self-blame' coping strategies are generally regarded as maladaptive in situations where active coping is needed. The others, according to the author, are less obviously adaptive.

C. Questionnaire modification

Standardised instructions were given to all participants at the second and third assessment to ask them since the MI event, to what extent and how frequently they were doing what each item says.

D. Scoring

Each item has four numbers ranging from: 0 = "I haven't been doing this at all", 1 = "I've been doing this a bit", 2 = "I've been doing this a medium amount" to 3 = "I've been doing this a lot". Separate scores for each of the 14 categories were computed by adding the two related items together and each coping strategy score ranged from 0 to 6. As the scale designer strongly suggested use the original 14 coping categories instead of combining them into fewer but broader dimensions, the original 14 categories were used in the analysis.

7.1.5. Other information

7.1.5.1. Marital satisfaction

To measure patients' marital satisfaction, one item which was adopted from the Dyadic Adjustment Scale (Spanier, 1976) was used. Goodwin (1992) reported that this item had a similar predictive power of marital satisfaction when compared with the full Dyadic Adjustment Scale. At the second assessment, patients who had spouses or partners were asked to answer this question on a six-point scale ranging from 0 = "extremely unhappy" to 6 = "perfect".

7.1.5.2. Physical co-morbidity

To examine the possible confounding effects of other physical illnesses on patients' psychosocial states (moods), a self-designed co-morbidity questionnaire was administered to patients at two follow-up assessments. Using a 'yes/no' answer, patients were asked whether they had any other ongoing physical illness at that time and what effects these illnesses may have had on their lives.

The following illnesses were listed: heart attack, angina, stroke, hypertension, diabetes, cancer, arthritis, and 'other'. For each illness, patients were asked to rate the level of

influence on their lives from "not at all" (= 0) to "a great deal" (= 3). In addition, patients were asked to name these illnesses in order according to which affected them the most.

7.1.5.3. Smoking and drinking

At the first and the final assessment, patients were asked about their smoking and drinking habits. In addition, spouses were also asked about their smoking habits at their first assessment.

7.1.5.4. Demographic and medical information

Demographic information was collected during the baseline assessment, including age, race, gender, marital status, living arrangement, level of education, employment status, and annual income. Data on patients' medical condition was obtained from hospital charts. It included infarct size and previous medical history.

7.2. Procedures

7.2.1. Recruitment of participants

This study was conducted at the Whittington Hospital and University College Hospital, London. Ethical approval was given by both Ethical Review Committees. New MI referrals to the cardiac wards were suitable for the study providing they were first-time MI patients and fulfilled the recruitment criteria (Appendix A-2).

Once an MI patient's condition was stable (normally after 4-5 days of hospital admission), the cardiac nurse approached that patient to explain the research and provide the information sheet and the consent form (Appendix A-3 & A-4). After the patient agreed and signed the consent form, the researcher was introduced to the patient. If that patient had a spouse who also fulfilled the recruitment criteria, the researcher then approached this spouse with the information sheet and consent form (Appendix A-5 & A-6) before the patient was discharged from hospital.

7.2.2. Schedule of data collection

7.2.2.1. Pilot study

Before the formal data collection started, a pilot study was carried out to ascertain the feasibility of the research and its acceptability to patients, their spouses and the staff on the cardiac wards. Seven patients and one spouse were assessed using the questionnaires to check the logistics and acceptability of the design.

During the pilot study, it was identified that brief information of ongoing disease (co-morbidity) assessment was necessary at the second and third assessment. Questions related to any ongoing illnesses and how these illnesses impacted upon patients' lives were used at both two follow-up assessments.

In addition, two questionnaires originally used in the pilot study were replaced by other questionnaires:
UCLA Social Support Inventory questionnaire (Riegel & Dracup 1992) was replaced by the Multidimensional Scale of Perceived Social Support (MSPSS, Zimet et al., 1988). The former scale took more than 40 minutes for the MI patients to complete and its published psychometric information was sparse.

The negative affect of PANAS (Watson et al., 1988) was replaced by the original 20-item version in order to measure the participants' positive affect.

7.2.2.2. Procedures for patients

During hospitalisation, the MI patients who agreed to participate in this study were given a set of self-administered questionnaires by the researcher. The researcher then guided the patients to answer all the questions.

At the two follow-up assessments, patients were contacted either by telephone or by letter at 4-8 weeks (time 2) and 6 months (time 3) post-MI. This was usually organised to co-ordinate with their outpatient appointments. If a patient was unable to meet the researcher at hospital, a home-visit was arranged. If this was not convenient for the patient, a set of questionnaires were posted along with an enclosed stamped addressed envelope. A phone-call reminder was made two weeks later if the questionnaires were not returned.

7.2.2.3. Procedures for spouses

Before patients were discharged from hospital, consenting spouses were given a different set of questionnaires as the first assessment. The two follow-up assessments were normally arranged on the same date as the patients' outpatient appointment. If the spouses could not come with the patients, the researcher either arranged a home-visit or a set of questionnaires would be posted to the spouses. Both the patients and spouses were encouraged not to discuss the contents of the questionnaires with each other. If possible, couples were asked to fill in the questionnaires in separate rooms.

7.2.3. Sample size estimation

Before starting data collection, sample size was calculated on G*Power software (Devilly, 1998). Comparison and multivariate regression techniques were used to estimate sample size. With 95% confidence, medium effect size and 80% power, 150 first-time MI patients and 60 spouses were set to be required over two years. However, after piloting, two obstacles emerged: (1) Because a significant portion of MI patients who were admitted to the two collaborated hospitals had had MI experience(s); it was difficult to recruit enough first-time MI patients within two years; (2) Because most of the MI patients were old and/or widowed, there were not enough spouses to be recruited. Due to these reasons, the target sample size was revised to approximately 120 patients and 30 spouses (Appendix A-7).

7.3. Data analysis

7.3.1. Database

Statistical Package for Social Science (SPSS) 12.01 for Windows (Norusis, 1993) at University College London (UCL) was used to carry out the analyses. For the analyses during patients' hospitalisation, all the recruited participants were included. For the long-term analyses (from patients' hospitalisation to 4-8 weeks and up to six months post-MI), only those who completed two follow-up assessments were included. For all questionnaires, if half or less than half of the answers (50% of the total items, King, et al. 1998) were missing, the average of the remainder within that same scale from that respondent was used to replace those missing answers and give a total score, otherwise that particular questionnaire was discarded.

7.3.2. Statistical analysis

7.3.2.1. Criterion settings of general statistical analyses

The absolute score of raw data ($|\text{raw data}|$) ≥ 3 standard deviation (SD) was used as the criterion for identifying univariate outliers and "Mahalanobis value" was used for identifying multivariate outliers. The distribution normality of each measure was subjected to Kolmogorov-Smirnov goodness fit at each time point. A number of data were found not normally distributed, but square root and natural log transformation could not surrender them normal. Based on this result and the suggestion that parametric statistics are robust when sample size is not small (Howell, 2001), raw scores were therefore used for the parametric statistical analyses.

In terms of comparison tests, chi-square, t-tests and one-way ANOVA were used to compare categorical and interval data and Games-Howell pair-wise test, Tamhane's T2, T3 and Dunnett's C were used to conduct ANOVA's post hoc comparisons due to unequal sample sizes and variances. Correlations were conducted by Pearson's (for interval or ratio scales), Spearman's (for ordinal scales) or Point Bi-Serial (for one dichotomous and one interval or ratio scale) correlation coefficient. Scatter plots were screened to check linear relationships between correlation coefficients which reached $p \leq 0.01$, and outliers (scores higher or lower than 3 SD, as defined on the previous paragraph) were considered.

Repeated measures ANOVA were used to test any significant interactions or main effects over time and Greenhouse-Geisser-corrected degree of freedom were employed to guard against violations of *Sphericity* (referring to equal variances/co-variances across conditions) when reporting within-subject effects.

Due to a large number of analyses, significance level was set at $p \leq 0.01$ instead of using *Bonferroni* adjustment to control Type I error, as the balance among actual sample size, statistical power, Type I and Type II error was considered. However, while using repeated measure ANOVA, the p value of Mauchly's test of *Sphericity* was set at $p \leq 0.05$ instead of $p \leq 0.01$ in order to be more conservative and to detect unequal variances across groups/times. If the assumptions were violated, Greenhouse-Geisser estimation was applied.

7.3.2.2. Principal component analysis

Principal component analysis was used to examine and compare the component validity of the Illness Perception Questionnaire (IPQ) reported by the original designers (Petrie & Weinman, 1997). Three assumptions were tested before conducting factor analysis:

- Kaiser-Meyer-Olkin (MKO) should be ≥ 0.50 for each individual item and each component in order to test the sampling adequacy.
- Bartlett's test of *Sphericity* was used to examine whether the original correlation matrix is an identity matrix (p value should be ≤ 0.01).
- Multicollinearity was used to test related correlation matrix (R-matrix) and the determinant value should be greater than 1×10^{-5}.

In terms of rotation, direct Oblimin rotation was used, because several researchers have suggested that illness perception components may be correlated (Petrie et al., 1996). Both Eigen values and Scree plots were taken into account when choosing the numbers of components. Eigen values were considered acceptable if greater than 1.0 and the point the Scree plot slope starts to decrease dramatically was regarded as an index of the number of components. To match the theoretical background of IPQ, Cronbach's alpha coefficients were set at ≥ 0.60 as desirable.

7.3.2.3. Regression

Multivariate analyses of hierarchical regression were used to explain and predict participants' moods and to test mediating effects. Since past studies have suggested some significant correlations between demographic information and moods (Bengtsson et al., 2001; Sykes et al., 1999), age, gender, education, income, and ethnicity were considered first to control their potential influences. In terms of mood prediction/explanation, main predictors were confined to illness perceptions, extending to other relevant variables including social support and coping, as the key task was to explore illness perceptions' contribution to participants' moods. The basic predictor entrance orders were: demographic variables first, symptom perception, and then other illness perceptions. The reason for this order was that theoretically, symptom perception triggers other illness-related perceptions. Separating symptom perception from other illness perceptions would help to explore its possible role in explaining moods.

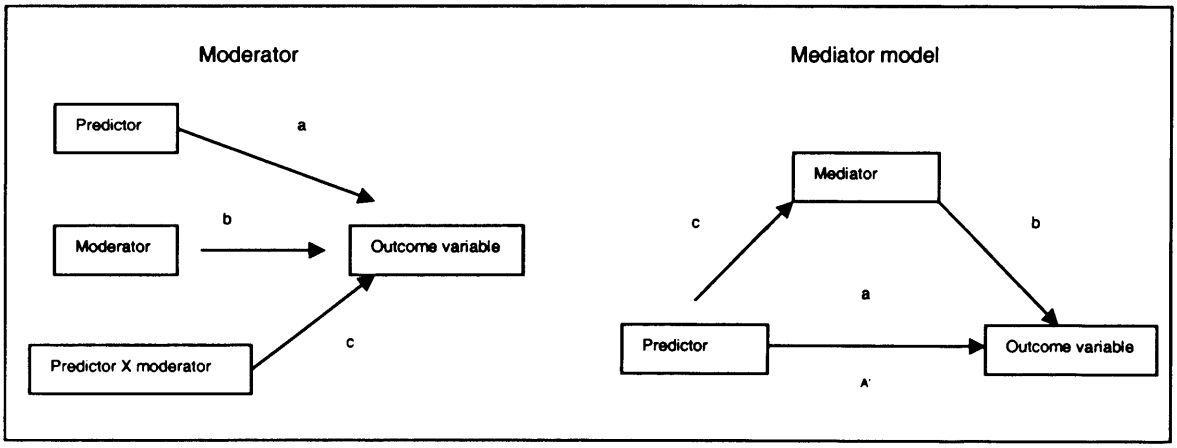
The criteria for predictor selection were based on the correlation coefficients reaching p ≤ 0.01, as researchers have suggested per predictor should have at least five subjects,

preferably 20 subjects (Howell, 1997). However, in order not to lose potentially important predictors, the p value was set at ≤ 0.05 at the final equation. 'Mahalanobis distance value' (multivariate diagnostics set at p ≤ 0.001) and 'Casewise diagnostics' (absolute score of standardised residual ≥ 3 units) were used to detect possible influential cases after a regression solution was made. If influential participants were detected, their data were removed and then regression was re-run. Correlation matrix (should < 0.8), Tolerance variable (according to Myers, 1990, this value should > 0.1), residual plots and Durbin-Watson statistic (this value should be close to 2.00) were examined for the assumption.

7.3.2.4. Mediating effect tests

Hierarchical regression was used to test mediating effects. Baron and Kenny (1986) distinguished the differences between 'mediator' and 'moderator' in their 1986 classic paper. According to them, a moderator is a variable that affects the direction and/or strength of the relation between two variables (independent variable/predictor and dependent variable/criterion variable). A mediator is a variable which mediates an independent variable on one dependent variable (Figure 7.1).

Figure 7. 1. Concepts of moderator model and mediator model



To qualify as a mediator or a moderator, a number of criteria should be met. Table 7.3 summarises the criteria of being a mediator or a moderator.

Table 7. 3. Criteria of moderators vs. mediators

Moderator	Mediator
Path c should be significant	Predictor significantly accounts for mediator (path c)
Ideally the moderator should be uncorrelated with both the predictor and the outcome variable	Mediator significantly accounts for outcome variable (path b)
Both moderator and predictor are causal variables	When path b & c are controlled, the previous significant relation (path A) is no longer significant (path a)

Based on Table 7.3, a mediating effect was tested by running regression analyses, which includes four steps:

Step 1: The dependent variable regresses on the predictor

Step 2: The mediator regresses on the predictor

Step 3: The dependent variable regresses on the mediator

Step 4: The dependent variable regresses on the predictor and the mediator together.

Following the above four steps, *'Sobel test'* (Sobel, 1988) was further conducted to elucidate the mechanism from the predictor to the dependent variable. P value was set at ≤ 0.05 as significant in 'Sobel test'.

7.3.2.5. Confidence interval

As statistical p value was set at ≤ 0.01, the presentation of confidence interval (CI) was set at 99%. A number of figures involving mean scores were presented with mean ± 2.58 x standard error (SE) to meet the 99% CI (Streiner, 1996).

7.4. Conclusion

This chapter has presented the psychological measures and statistical methods used in this study. Findings from MI patients' data and MI couples' data are presented in chapter 8 to chapter 11. Due to space limitations, only significant findings ($p \leq 0.01$) are presented, with full result tables attached in the Appendix.

CHAPTER EIGHT – IN-HOSPITAL FINDINGS OF FIRST-TIME MI PATIENTS

Guided by research aims and hypotheses, this chapter presents 119 first-time MI patients' emotional and cognitive responses during hospitalisation. Data was collected after 4-5 days hospital admission and before discharge. One hundred and eighty-eight hospitalised patients were invited to take part in this study. One hundred and twenty one agreed. However, one male patient died from a cardiac arrest before his first assessment. Another male felt too stressed and only filled in less than half of the questionnaires. Finally, 119 MI patients' first-assessment data was analysed, including one male who did not fill in the ten 'positive affect' questions which were therefore treated as 'missing'.

8.1. Characteristic descriptions of MI patients

8.1.1. Demographic data

Table 8.1 describes the patients' demographic data including age, race, and income, etc. The mean age of these patients was 60.6 years old (Standard Deviation (SD) = 12.49; range: 29 – 84; 99% confidence interval (CI): 57.62 – 63.57), with an average of 10.96 years education (SD = 2.59, range: 5 – 20; 99% CI: 10.34 – 11.58).

Table 8. 1 The 119 MI patients' demographic information

	119 patients	
Gender	Males = 90 (75.6%)	Female = 29 (24.4%)
Living condition	Alone = 45 (37.9%)	Not alone = 74 (62.1%)
Ethnicity	Caucasian = 96 (80.7%)	Other (Asian, Black) = 23 (19.3%)
Partnership	With a partner = 65 (54.6%)	No partner = 54 (45.4%)
Job	Full-time = 59 (49.6%); Part-time: 4 (3.4%)	Unemployed = 11 (9.1%); Retired = 45 (37.9%)
Income	< 10,001— 57 (47.9%)	>=10,001 – 62 (52.1%)

8.1.2. Characteristics related to disease

The mean time between hospital admission and the first (baseline) assessment was 5.51 ± 2.39 days (range: 3 – 17; 99% CI: 4.94 – 6.09). At the time of patients' MI onset, their MI sites were recorded into three categories: twenty-four (20.2%) patients had anterior MI, 56 (47%) had inferior MI and 39 (32.8%) had other types of MI. Overall, 74 (62.2%) were thrombolysed at the accident & emergency (A & E) department. Details of these patients' co-morbidity are listed on Table 8.2.

Table 8. 2. The 119 MI patients' medical information

Patient Participant	Yes	No	Unknown
Family CHD	70 (58.8%)	45 (37.8%)	4 (3.4%)
Diabetes	23 (19.3%)	96 (80.7%)	---
Hypertension	28 (23.5%)	91 (76.5%)	---
Thrombolysis	74 (62.2%)	39 (32.8%)	6 (5%)
Smoking history	62 (52.1%)	25 (21%)	Ex-smoke: 32 (26.9%)

8.2. What are first-time MI patients' emotional responses during hospitalisation?

Table 8.3 lists the mean score of MI patients' moods during their hospitalisation, in addition to two genders' mean scores.

Table 8. 3. The 119 MI patients' mood responses

Mood	Total MI participant's mean score (S.D) 99% CI	90 male MI patients' mean score (S.D) 99% CI	29 female MI patients' mean score (S.D.) 99% CI
Depression (CESD)	16.99 (11.33) 14.27 – 19.71	15.79 (10.68) 18.75 – 12.82	20.72 (12.62) 27.20 – 14.25
State anxiety (STAI-State)	36.19 (13.01) 33.05 – 39.33	34.52 (11.82) 37.80 – 31.24	41.38 (15.52) 49.34 – 33.42
Positive affect (PANAS-P)	26.47 (7.62) 24.63 – 28.30	26.75 (7.47) 28.84 – 24.67	25.59 (8.13) 29.76 – 21.41
Negative affect (PANAS-N)	20.18 (9.38) 17.85 – 22.52	20.05 (9.47) 22.75 – 17.34	20.62 (9.28) 25.69 – 15.54

CDSD: Centre for Epidemiological Studies Depression Scale; STAI: Spielberger's State-Trait Anxiety Inventory; PANAS: Positive and Negative Affect Scale

Because CESD uses score 16 as the cut-off point to distinguish normal and people with possibly elevated depressive symptoms, this study also used the same criterion to further examine depression. Overall, the mean score of the 119 MI patients was higher than 16. Fifty-eight patients (48.7%) had mild to severe depression during hospitalisation, of whom 40 (33.6%) were males and 18 (15.1%) were females. Although

female MI patients reported higher scores on depression, there was no significant difference between genders (Appendix B-1).

The mean score of the MI patients' anxiety was within the range of published norm score (35.88 – 36.03 for age 40 – 49; 32.2 – 34.51 for ages 50 – 69) (Spielberger et al., 1983ab). Although female MI patients were more anxious than the published normal population and male MI patients, there was no significant difference between genders. Also, to examine normal vs. possible anxious MI patients, score = 50 was used as the cut-off point (Fell et al., 1993). Overall, 25 (21%) patients were high on anxiety, with 15 males (16.7% of total males) and 10 females (34.5% of total females) scoring over 50.

In terms of positive and negative affect, the 119 MI patients reported a lower positive and a higher negative affect than the published norm (33.3 ± 7.2 for positive affect and 17.4 ± 6.2 for negative affect). There was no significant difference between genders.

8.3. What are first-time MI patients' illness perceptions during hospitalisation?

In order to check whether current MI patients had formed five illness perceptions during hospitalisation and to compare with previous studies (French et al., 2005abc; Petrie & Weinman, 1997; Weinman et al., 1996), principal component analysis was conducted on causes, timeline, cure/control and consequence sub-scales of IPQ.

All three assumptions (KMO, Sphericity & multi-collinearity, section 7.3.2.2) were tested on four subscales before running the analysis. The results indicated that all assumptions were not violated (Table 8.4). Based on the suggestions that the five theoretical structures of illness perception depending on each other (Petrie & Weinman, 1997), Principal Component Analysis with Direct Oblimin rotation was conducted. The results of factor analyses are presented in the following sections separately.

Table 8. 4. The assumption tests for principal component analysis

	IPQ-causes	IPQ-cognition
KMO value	0.78 (> 0.50)	0.74 (> 0.50)
Bartlett's test	Sig. < 0.001	Sig. < 0.001
Multicollinearity (determinant value, D)	D = 1.545E-04 (>10^{-5}, acceptable)	D = 2.133E-5 (>10^{-5}, acceptable)

8.3.1. Causal attributions of MI

This section starts with the presentation of 24 individual MI causes, which were listed on the IPQ, following by presenting the factor components after these causes were factor analysed.

8.3.1.1. Individual MI causes

Figure 8.1 presents 119 patients' mean scores on 24 individual MI causes. 'Stress' was the most often agreed MI cause. After combining the frequency of 'agree' and 'strongly agree', 'stress' still stood as the most frequently agreed answer (69.7%). The ranks of the remaining causes only changed slightly (Table 8.5).

Table 8. 5. The 119 MI patients' top five most agreed MI causes

Top five Causes	With high mean score	Mean (SD, 99% CI)	With high percentage of 'Agree & Strongly agree'	Percentage
1	Stress	3.84 (1.21) (3.55 – 4.13)	Stress	69.7%
2	High level of cholesterol	3.43 (1.03) (3.18 – 3.68)	Smoking	54.6%
3	Smoking	3.25 (1.52) (2.89 – 3.62)	High level of cholesterol	47.0%
4	Eating fatty food	3.18 (1.28) (2.88 – 3.49)	Heredity	45.4%
5	Heredity; Hypertension	3.08 (1.44) (2.74 – 3.43) 3.08 (1.22) (2.79 – 3.38)	Eating fatty food Hypertension	43.7%

Table 8.6 further lists the top five causes, which were the most disputed by the 119 patients during their hospitalisation. 'Poor past medical care' was the least common cause. If one counted the combined frequency of 'agree' and 'strongly agree', 'a germ or virus' became the least common cause and the rank order also changed slightly.

Table 8. 6. The 119 MI patients' top five most disputed MI causes

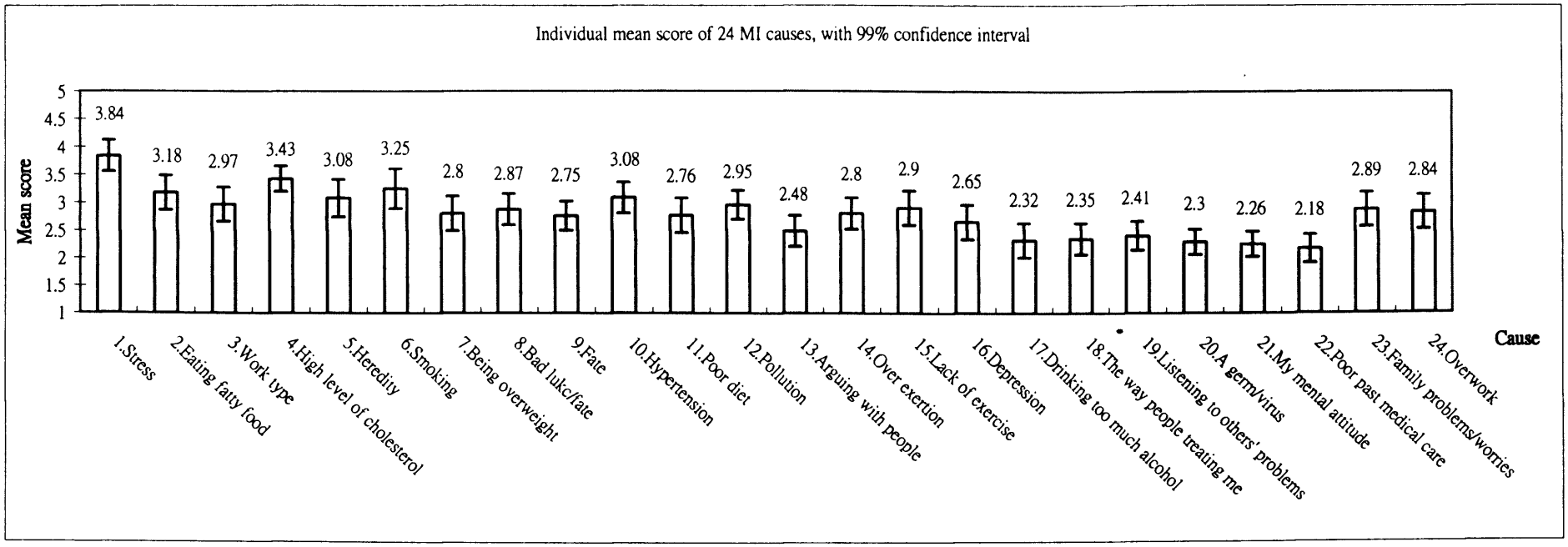
Bottom five Causes	With high mean score	Mean (SD, 99% CI)	With high percentage of 'Agree & Strongly agree'	Percentage
1	Poor past medical care	2.18 (1.05) (1.93 – 2.44)	A germ/virus	10.92%
2	My mental attitude	2.26 (1.00) (2.02 – 2.50)	My mental attitude	13.44%
3	A germ/virus	2.30 (0.94) (2.08 – 2.53)	Poor past medical care	16.81%
4	Drinking too much alcohol	2.32 (1.26) (2.02 – 2.62)	The way people treating me	18.49%
5	The way people treating me	2.35 (1.22) (2.06 – 2.65)	Listening to others' problems	20.17%

Also, over 30% of the MI patients were uncertain regarding the following three causes: *high level of cholesterol* (41%), *pollution* (38%) and *a germ or virus* (30%).

Of those patients who had hypertension (N = 28), 10 (35.7%) strongly agreed and 12 (42.9%) agreed on 'hypertension'. Of those patients who had a family CHD history (N = 70), 25 (35.7%) strongly agreed and 22 (31.4%) agreed on 'heredity'. Of those current smokers (N = 62), 28 (45.2%) strongly agreed and 24 (38.7%) agreed on 'smoking'. Finally, of those ex-smokers (N = 32), five (15.6%) strongly agreed and 8 (25%) agreed on 'smoking'.

To examine whether there were significant differences between genders on individual MI causes, independent t-tests were used and only one cause showed a significant difference between genders – male MI patients tended to accept causes related to 'pollution in the environment' than female patients ($t = 2.815$, $p = 0.006$, Appendix B-2).

Figure 8. 1. Individual mean score of the 119 MI patients' causal attributions



8.3.1.2. Principal component analysis of MI causes

Assumption tests for factor analysis showed all 24 causes from IPQ were qualified for principal component analysis (KMO > 0.50). After Scree plot and Eigen values were taken into account, these 24 items generated 3-5 factor components.

Although the 4-factor and 5-factor solutions explained more of the total variance, the causal items within each factor component of the 3-factor solution were more coherent and consistent. Component 1 contained 9 items (No.19, 24, 1, 23, 18, 13, 16, 21, 3, 14) which were related to 'stress' (e.g. listening to other people's problems, over work, worry and family problems, etc.). Therefore, *'stress'* was used to label component 1. Component 2 contained 4 items (No.8, 9, 20, 12) and they all linked with factors which cannot be controlled by human beings (e.g. fate, bad luck/chance). It seemed reasonable to label it as *'un-controllable or external causes'*. Component 3 contained 8 items (No.7, 4, 2, 11, 10, 15, 17, 6) and these items all linked with unhealthy lifestyles or eating habits (e.g. being overweight, high level of cholesterol, poor diet, etc.). Therefore, *'unhealthy lifestyle or behaviour'* seemed to be a right label for this component. Overall, two items (No. 22 - "poor medical care in the past" and No. 5 -"heredity-runs in your family") were not included (Table 8.7).

Table 8. 7. The 119 MI patients' mean scores of three causal attribution components

Causal component	Mean score (SD)	99% CI
1. Stress	2.75 (0.79)	2.56 – 2.94
2. External/ uncontrollable causes	2.72 (0.72)	2.55 – 2.89
3. Unhealthy lifestyles/behaviours	2.97 (0.81)	2.77 – 3.12

The mean scores of the three causal components are presented in Table 8.8. On average the patients tended to choose "don't know" as the close answer.

Information from Appendix B-2 also indicated no significant differences on the three causal components between genders.

Table 8. 8. Principal component analysis of MI causes of the 119 MI patients

Items of MI causes	Three factor components			Four factor components				Five factor components				
	Component 1	Component 2	Component 3	Component 1	Component 2	Component 3	Component 4	Component 1	Component 2	Component 3	Component 4	Component 5
19. listening to other people's problems	**0.739**	0.042	-0.085	**0.668**				**0.617**				
24. overwork	**0.657**	-0.073	0.047	**0.618**				0.500				**-0.547**
1. stress or worry	**0.650**	-0.432	-0.226	**0.725**				**0.697**				
23. family problems or worries	**0.644**	-0.310	0.140	**0.742**				**0.742**				
18. the way other people treated you	**0.639**	0.264	0.273	**0.575**				**0.556**	0.413			
13. arguing with people	**0.613**	-0.066	0.203	**0.732**				**0.742**				
16. depression	**0.600**	0.029	0.136	**0.688**				**0.713**				
21. your mental attitude	**0.590**	0.157	-0.009		**0.480**				**0.517**			
3. the type of work you do or did	**0.545**	0.050	0.041									**-0.553**
14. over exertion or sudden exercise	**0.445**	0.095	0.284									
Component 1 – Stress												
α = 0.85; explained variances = 24.813%												
8. just bad luck or chance	-0.193	**0.663**	-0.068				**0.789**				**0.818**	
9. fate	-0.179	**0.616**	0.017				**0.842**				**0.859**	
20. a germ or virus	0.274	**0.576**	-0.094		**0.672**				**0.824**			
12. pollution in the environment	0.276	**0.535**	0.063		**0.446**						**0.403**	
Component 2 – Un-controllable/external causes												
α = 0.59; explained variances = 9.583%												
7. being overweight	-0.121	-0.027	**0.803**			**0.792**				**0.709**		
4. high level of cholesterol	-0.065	-0.138	**0.655**			**0.672**				**0.675**		
2. eating fatty food	0.107	-0.127	**0.634**			**0.618**				**0.620**		
11. poor diet	0.138	-0.105	**0.628**			**0.594**				**0.554**		
10. high blood pressure	0.041	0.340	**0.568**			**0.605**				**0.648**		
15. lack of exercise	0.059	0.082	**0.558**			**0.532**						**0.481**
17. drinking too much alcohol	0.085	0.178	**0.543**			**0.570**				**0.628**		
6. smoking	0.180	-0.082	**0.455**			**0.495**				**0.564**		
Component 3 – Unhealthy lifestyle & behaviour												
α = 0.79; explained variances = 8.517%												
22. poor medical care in the past	0.342	0.288	0.038		**0.613**				**0.719**			
5. heredity-runs in your family	-0.064	-0.319	0.318		**-0.466**							
	Total explained variances = 42.91%			Total explained variances = 49.59%				Total explained variance = 54.82%				

8.3.1.3. Principal component analysis of MI timeline, consequences, and cure/control

The 30 items used to measure the 119 MI patients' perceptions of their illness timeline, consequences and cure/control were also submitted to principal component analysis. The presumption tests showed two items had KMO values < 0.50 (No. 28 – "My illness will be controlled by physical exercise"; and No. 29 – "My illness will be controlled by reduced stress"). Therefore, these two items were excluded. After Scree plot and Eigen values were considered, the remaining 28 items extracted 3-5 components (Table 8.9).

As the extracted components should match the three theoretical components (timeline, consequences, and cure/control), and items within each component should be coherent, a 5-factors solution was finally chosen. Of these five components, two represented 'illness consequences' and two represented 'illness cure/control'. These components were explained as follows.

- *Physical/external consequences* (No. 25, 27, 18, 1, 20, 19, 26) – items within this component reflected physical impacts of MI on the patients. Therefore, 'physical/external consequences' was used to label this component.
- *Emotional consequences* (No. 2, 12, 11, 3, 30, 10) – the majority items within this component linked with consequences which were related to emotional aspects, e.g., the symptoms of my heart problem are distressing to me. Therefore, it seemed reasonable to label it as 'emotional consequences'.
- *Timeline* (No. 17, 7, 23, 24, 5) – all these five items were related to whether or not MI will last long. This component was therefore, labelled 'timeline'.
- *Active control* (No. 15, 9, 13, 4) – these four items focused on the patients' active role in controlling or improving their illness.
- *Passive control* (No.14, 22, 8, 21) – these items described nothing could be done by the patients to improve their illness.

Table 8. 9. Principal component analysis of timeline, consequences and cure/control of the 119 MI patients

Item	5 Components solution					4 component solution				3 component solution		
	1	2	3	4	5	1	2	3	4	1	2	3
Component 1: Physical/external consequences												
α = 0.79; explained 21.226% of variance												
25. my illness will have serious financial and economic consequences	**0.736**	-0.022	0.010	-0.147	0.156	**0.570**				**0.629**		
27. my illness will strongly affect the way others see me	**0.640**	-0.041	-0.320	0.028	0.044					**0.418**		
18. the symptoms of my illness affect many parts of my body	**0.635**	-0.074	-0.103	0.099	0.053					**0.442**		
1. the symptoms of my heart problem change a great deal from day to day	**0.626**	0.229	0.136	-0.159	0.002	**0.622**				**0.613**		
20. the symptoms of my illness are constant	**0.625**	-0.185	-0.059	0.128	-0.312				**0.466**	**0.657**		
19. I am aware of my symptoms all the time	**0.569**	-0.031	0.103	-0.017	-0.154	**0.414**				**0.618**		
26. my illness will be disabling	**0.538**	-0.307	-0.017	0.018	-0.084		**-0.495**			**0.556**		
Component 2: Emotional consequences												
α = 0.66; explained 5.735% of variance												
2. the symptoms of my heart problem are distressing to me	0.055	**-0.662**	-0.194	0.156	-0.171	**0.633**				**0.596**		
12. my illness will not have much effect on my life	0.128	**0.607**	0.156	0.187	-0.255				**0.477**			
11. my illness will become easier to live with	0.146	**0.554**	0.160	0.385	0.030			**0.551**				**0.438**
3. the symptoms of my heart problem are puzzling to me	0.212	**-0.494**	0.208	-0.078	-0.221	**0.607**				**0.508**		
30. my illness is a serious condition	0.118	**-0.459**	-0.324	0.359	0.031	**0.507**				**0.513**		
10. my illness has major consequences for my life	0.357	**-0.441**	0.081	0.161	0.231	**0.648**				**0.451**		
Component 3: Time-line												
α = 0.79; explained 10.214% of variance												
17. my heart problems will last for a long time	0.120	-0.054	**-0.797**	0.062	-0.130		**-0.827**				**-0.563**	
7. my heart problem will last a short time	0.074	0.091	**0.789**	-0.089	-0.071		**0.761**				**0.678**	
23. my illness is likely to be permanent rather than temporary	0.215	-0.054	**-0.695**	0.085	-0.152		**-0.759**			0.471	**-0.478**	
24. my illness requires long-term care	0.403	-0.143	**-0.504**	0.133	0.152		**-0.643**			0.485	**-0.556**	
5. my heart problem will improve in time	-0.004	0.059	**0.487**	0.307	-0.122		**0.493**				**0.486**	
Component 4: Active control												
α = 0.62; explained 8.883% of variance												
15. what I do will determine whether my illness gets better or worse	-0.036	0.166	-0.225	**0.775**	0.048			**0.780**				**0.704**
9. there is a lot which I can do to control my symptoms	-0.208	0.122	-0.019	**0.624**	0.128			**0.634**				**0.627**
13. my treatment will be effective in curing my illness	-0.003	-0.196	0.403	**0.619**	-0.040	0.450	0.428	**0.522**				**0.648**
4. changing my diet will help to control my heart problem	0.010	-0.096	-0.026	**0.599**	-0.051			**0.525**				**0.538**
Component 5: Passive control												
α = 0.65; explained 5.119% of variance												
14. recovery from my illness is largely dependent on chance or fate	-0.047	0.107	-0.056	-0.026	**-0.782**				**0.733**		**0.488**	
22. my illness will go away on its own	-0.151	-0.014	0.333	-0.099	**-0.695**		0.429		**0.612**		**0.728**	
8. there is very little that can be done to improve my illness	-0.024	-0.239	-0.211	-0.276	**-0.601**			-0.406	**0.449**	0.406		**-0.497**
21. my illness will be controlled by rest	0.162	0.028	-0.047	0.198	**-0.541**				**0.535**	**0.493**		
16. my illness has strongly affected the way I see myself as a person						**0.444**				**0.544**		
6. my illness comes and goes in cycles						**0.511**				**0.504**		
	Total explained variance = 51.18% of variance					Total explained variance = 46.06%				Total explained variance = 40.32%		

Table 8.10 lists the mean scores of these components. In addition, the result of one item that was used to measure MI patients' perception of future MI is also presented.

Table 8. 10. Mean scores of principal component analysis of timeline, consequences, cure/control and fear of future MI from the 119 MI patients

Timeline, consequence, cure/control and future MI threat	Mean score (SD)	99% CI
Timeline	3.09 (0.76)	2.91 – 3.27
Physical consequences	3.07 (0.74)	2.90 – 3.25
Emotional consequences	3.30 (0.65)	3.14 – 3.45
Active control	3.99 (0.56)	3.86 – 4.12
Passive control	2.67 (0.73)	2.50 – 2.85
Future MI threat	3.12 (1.07)	2.86 – 3.37

Appendix B-3 lists two genders' perceptions on these factor components. There was no any significant difference between genders.

8.3.1.4. Perceptions of MI symptoms

The MI patients' symptom perception was examined in two ways: one was to examine each individual item, and the other was to examine the total score. Besides, two coding systems were used to calculate a total symptom score. The first was to code 'all the time' = 3, 'frequently' = 2, 'occasionally' = 1, and 'never' = 0 (Multi-response coding, MR). This was as one index of symptom severity. The second was to code the answers of either 'all the time', 'frequently', or 'occasionally' as "1" and 'never' as "0" (dichotomous coding, DI) in order to compare with previous studies (Weinman et al., 2000) and to reflect how many symptoms occurred.

A. Individual symptom perception items

Multi-response coding

The mean scores of 15 individual symptoms are presented in Figure 8.2. Table 8.11 lists the top five symptoms and a total score. The top five least reported symptoms were 'sore eyes', 'upset stomach', 'stiff or sore joints', 'headache' and 'irritability'.

Figure 8. 2. The 119 MI patients' mean score of individual MI symptoms (MR)

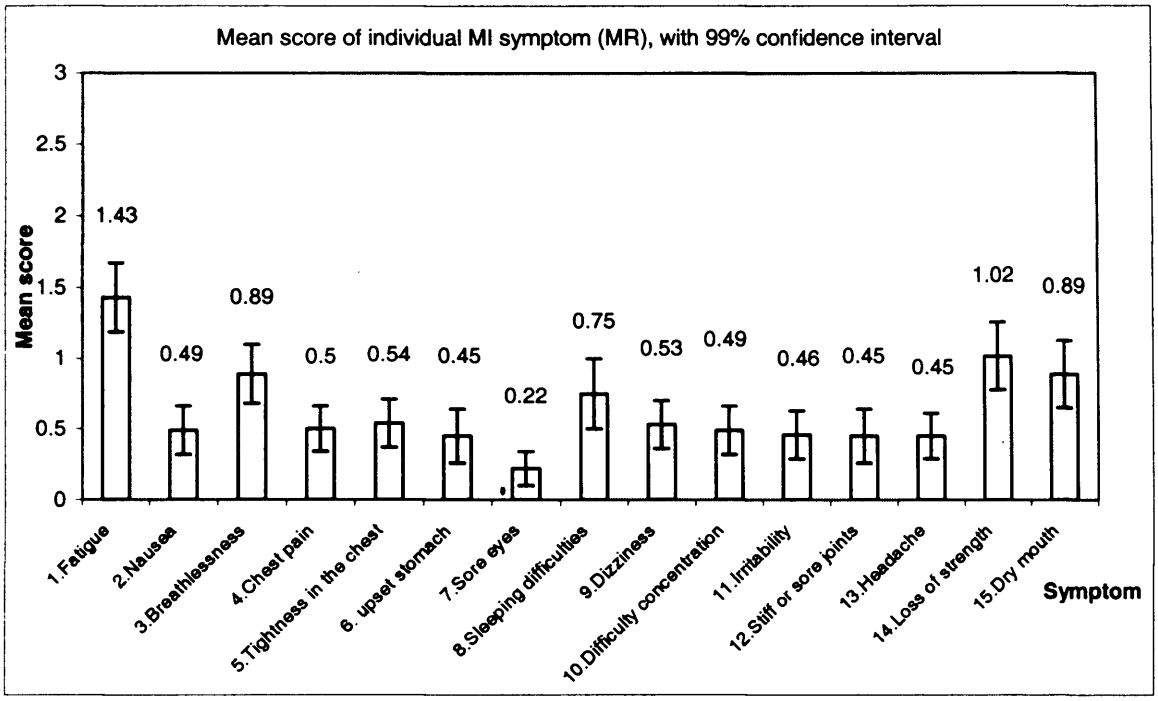


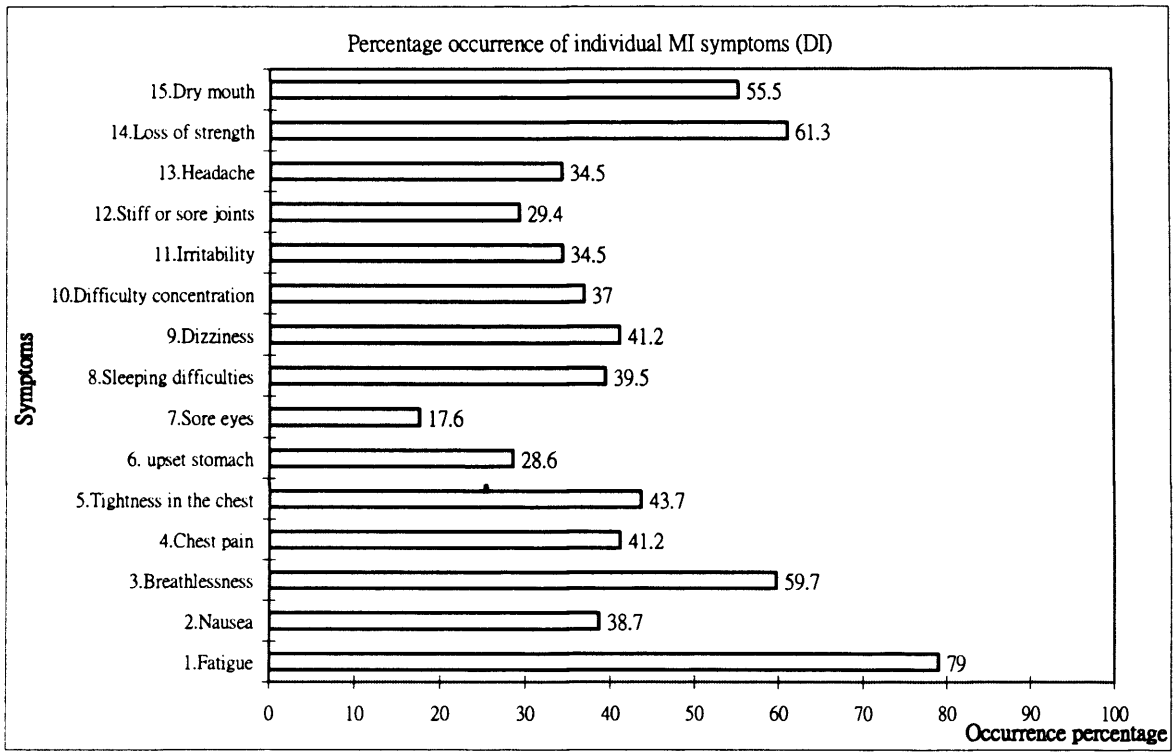
Table 8. 11. The 119 MI patients' top five perceived symptoms (MR)

Perceived MI symptoms (Top five symptoms)	Multi-response coding (MR)	Mean (SD, 99% CI)
1	Fatigue	1.43 (1.03) (1.18 – 1.68)
2	Loss of strength	1.02 (1.03) (0.77 – 1.26)
3	Breathlessness	0.89 (0.91) (0.67 – 1.11)
4	Dry mouth	0.89 (1.00) (0.65 – 1.13)
5	Sleep difficulties	0.75 (1.05) (0.50 – 1.00)
	Total score	9.54 (7.04) (7.85 – 11.23)

Dichotomous coding

Figure 8.3 displays occurrence percentage of the 15 individual MI symptoms reported by the 119 patients. The top four symptoms remained the same, but 'tightness in the chest/arm' became the top fifth symptom instead of 'sleep difficulties'. However, the rank order of the five least reported symptoms remained the same.

Figure 8. 3. The occurrence percentage of individual MI symptoms (DI) for 119 patients



These two coding systems (MR and DI) generated similar results for the top five most agreed and top five least reported symptoms. When using these two coding systems to calculate total symptom scores, they were also highly correlated ($r = 0.930$, $p < 0.001$). However, considering that multi-response coding system (MR) offered a wider spread and range of information of symptom frequency, MR was obviously more suitable for further analyses in correlation and regression. For this reason, further analyses related to symptom perception only used the data generated from MR coding, and its total symptom score was used in correlations and regressions.

8.4. Will demographic data correlate with MI patients' moods and illness perceptions during hospitalisation?

Pearson's r was used to measure correlations between two interval-scale variables and Point Bi-serial correlation coefficient was used to measure one interval with one dichotomous variable (i.e., income status ≤ £10,000 or not, ethnicity was Caucasian or not, and gender was male or not). Except for symptom perception, the rest four illness perceptions were represented by principal components, which were described in section 8.3.1.2 and 8.3.1.3. In total, there were three causal components (stress,

uncontrollable/external causes and unhealthy lifestyle/behaviours), one timeline component, two consequence components (physical and emotional consequences) and two control component (active and passive control). In addition, the perception of future MI threat and multi-response coded (MR) symptom perception were included to illness perceptions as well.

The correlations of the 119 MI patients' demographic data with moods and illness perceptions are presented in Table 8.12 (Appendix B-4 for the full table).

Table 8. 12. Significant correlations between the 119 MI patients' demographic data with moods and illness perceptions

Pearson's r (correlation)	Patients' age	Income status (> £ 10,000 or not)	Ethnicity (Caucasian or not)
Depression		-0.240**	
State anxiety			
Positive affect			-0.285**
Negative affect	-0.285**		
Causal component 1 – stress	-0.286**		
Causal component 2 – uncontrollable (external) causes			
Causal component 3 – unhealthy lifestyles	-0.231**		
Consequence component 1 - Physical consequences			
Consequence component 2 - Emotional consequences			
Timeline			0.295***
Control component 1 - Active control	-0.239**		
Control component 2 - Passive control	0.321***	-0.342***	
Future cardiac threat			
Symptom perception			

*** $p \leq 0.001$; ** $p \leq 0.01$

Correlations between MI patients' demographic data and moods

The results showed that none of the emotional scores significantly correlated with the 119 MI patients' length of stay in hospital between admission and first assessment, years of education and genders. Patients' age was significantly (negative) correlated with their negative affect ($r = -0.285$, $p = 0.002$). This indicated that the older the patients, the less negative affect they felt when they were in hospital. Besides, their financial condition was negatively correlated with their depression score (Point-Biserial correlation = -0.240, $p = 0.009$). Low-income MI patients (income ≤ £10,000) tended to be more depressed. Another finding was that their ethnicity seemed to negatively correlate with their positive affect (Point-Biserial correlation = -0.285, $p = 0.002$) and non-Caucasians reported more positive affect.

This finding led the researcher to compare Caucasians' (96 patients) and non-Caucasians' (23 patients) moods. The result indicated that Caucasians' average positive affect score was much lower than non-Caucasians' (25.26 ± 6.87 vs. 31.43 ± 8.67, t = -3.666, p < 0.001). Caucasians' average state anxiety was higher than the others' (37.57 ± 13.53 vs. 30.43 ± 9.23, t = 3.013, p = 0.004). It was difficult to say whether this was related to their living conditions or not, as 44.8% of Caucasians lived alone while only 8.7% of the other races lived alone ($\chi^2_{(1)}$ = 10.281, p = 0.001). However, as there was no significant difference on moods and illness perceptions between two living conditions, culture might be more relevant to this finding.

Correlations between MI patients' demographic data and illness perceptions

None of MI patients' illness perceptions significantly correlated with their years of education, the days between admission and the first assessment and gender. Overall, there were six significant correlation coefficients.

Patients' age negatively correlated with 'stress', 'unhealthy lifestyles' causal components, and 'active control' component. Age also positively correlated with 'passive control' component. This indicated that the older the patients, the less they believed that 'stress' and their lifestyles were the possible causes for their MI. Besides, the older they were, the less they believed that they could influence the MI through their behaviours, and the more they believed it was beyond their control.

The negative correlation between income status and 'passive control' component indicated those with low incomes (≤ £10,000) tended to believe that they could not control or improve their illness. Besides, Caucasian MI patients tended to believe they would not recover from their MI in a short period (Independent t-test: Caucasians: vs. others = 3.19 ± 0.73 vs. 2.64 ± 0.72, t = 3.257, p = 0.001).

8.5. What are the roles of illness perceptions in relation to MI patients' moods - Will their illness perceptions correlate with moods?

To test hypotheses 4-6, this section starts with the correlations of 119 first-time MI patients' illness perceptions and moods, followed by hypotheses testing. In addition, in order to understand the independence of MI patients' moods and the independence of their illness perceptions, section 8.5.2 and 8.5.3 are used to present these correlation results.

8.5.1. Correlations between MI patients' illness perceptions and moods during hospitalisation

Table 8.13 presents significant correlations between the 119 MI patients' moods and illness perceptions (Appendix B-5).

Table 8. 13. Significant correlations between the 119 MI patients' illness perceptions and moods during hospitalisation

	Moods		
Illness perceptions	Depression	State anxiety	Negative affect
Consequence component 1: Physical consequences	0.367***	0.278**	0.331***
Consequence component 2: Emotional consequences	0.393***	0.429***	0.462***
Timeline		0.341***	
Future MI threat	0.235**	0.362***	
Symptom perception	0.556***	0.454***	0.453***

*** $p \leq 0.001$; ** $p \leq 0.01$

A number of findings are summarised in the following paragraphs. However, because 'future MI threat' was measured by one item and its distribution was not normal, any significant correlation related to it should be viewed with caution.

First, none of the three causal components significantly correlated with post-MI moods. Secondly, 'physical consequences', 'emotional consequences' and 'symptom perception' all significantly (positively) correlated with depression, state anxiety and negative affect. The more the patients believed their MI had serious consequences, the more depressed, anxious or negative they felt.

'Future MI threat' also significantly (positively) correlated with both the MI patients' depression and state anxiety. The bigger threat they felt, the more depressed or anxious

they were. Finally, the longer illness timeline the patients perceived, the higher state anxiety they reported.

Hypotheses testing

H4: Those patients with strong perceptions that their MI will bring serious consequences would be more depressed and anxious.

As the 119 patients' perceptions of 'physical consequences' and 'emotional consequences' positively correlated with both of their depression and state anxiety, this hypothesis was supported during patients' hospitalisation.

H5: Those patients who believe they cannot control their MI would be more depressed and anxious.

As the 119 patients' perceptions of 'active control' and 'passive control' did not significantly correlate with their depression and anxiety before their discharge, this hypothesis was not supported.

H6: Those patients who believe their illness will last a long time would be more depressed and anxious.

This hypothesis was partially supported, as the perception of a longer illness timeline positively correlated with the MI patients' state anxiety, but not with their depression.

8.5.2. Correlations between MI patients' moods

Table 8.14 displays the correlations of the 119 MI patients' moods (Appendix B-5).

Table 8. 14. Correlations between the 119 MI patients' moods

Mood	1.Depression	2. State anxiety	3. Positive affect
State anxiety	**0.624****		
Positive affect	**-0.451****	**-0.300****	
Negative affect	**0.612****	**0.600****	-0.179

*** $p \leq 0.001$; ** $p \leq 0.01$

Depression, state anxiety, and negative affect all significantly (positively) correlated with each other. Positive affect negatively correlated with depression and state anxiety, but not significantly correlated with negative affect.

8.5.3. Correlations between MI patients' illness perceptions

Table 8.15 lists the significant correlations between the 119 MI patients' illness perceptions (Appendix B-5).

Table 8. 15. Significant correlations between the 119 MI patients' illness perceptions

	119 MI Patient participants' illness perceptions (Pearson's r, p value) during hospitalisation					
	Causal component 1: stress	Causal component 2: external causes	Causal component 3: unhealthy lifestyles	Consequence component 1: Physical consequences	Consequence component 2: Emotional consequences	Timeline
Causal component 3: unhealthy lifestyles/behaviour	0.483***					
Consequence component 1: Physical consequences	0.360***		0.308***			
Consequence component 2: Emotional consequences	0.292***			0.456***		
Timeline				0.468***	0.430***	
Control component 1: Active control			0.383***			
Control component 2: Passive control		0.366***				
Future cardiac threat				0.342***		0.590***
Symptom perception	0.344***		0.308***	0.386***	0.293***	

*** $p \leq 0.001$; ** $p \leq 0.01$

After screening scatter plots, the findings can be summarised as follows:
Firstly, the three causal components did not significantly correlate with each other, except that 'stress' cause was significantly (positively) correlated with 'unhealthy lifestyles/behaviours' cause. This indicated those MI patients who thought that 'stress' might have caused their MI also tended to believe 'unhealthy lifestyles/behaviours' could have caused it.

These three causal components also had significant correlations with other illness perceptions. 'Stress' component was positively correlated with both 'consequences' (physical & emotional) components and 'symptom perception'. 'Uncontrollable causes' component was positively correlated with 'passive control' component. 'Unhealthy lifestyles/behaviours' causal component positively correlated with 'physical consequences' component, 'active control' component and symptom perception.

These findings indicated that those patients who believed stress had caused their MI tended to believe their MI would bring them serious physical and emotional consequences. Besides, they also tended to perceive worse symptoms. In addition, those patients who thought their MI could be caused by 'external/uncontrollable' causes seemed to believe that they could not do anything about their MI. Finally, although those who believed that 'unhealthy lifestyles/behaviours' had contributed to their MI seemed to also believe they would face serious physical consequences and they reported worse symptoms during hospitalisation, they also had a tendency to believe that they had the ability to improve and control their illness.

One surprising finding was that "*whether these MI patients believed their illness would bring them serious consequences*" and "*how long their illness would last*" did not significantly correlate with their perception of being able to control the MI. However, their perception of 'physical consequences' significantly (positively) correlated with 'emotional consequences' and a longer recovery 'timeline'.

These findings implied that those patients who believed in serious 'physical consequences' also expected to have serious 'emotional consequences' and a longer recovery 'timeline'. In addition, these patients also reported more symptoms and believed a higher possibility of having another MI. Those who believed a longer recovery 'timeline', a higher level of fearing of a future MI and serious 'consequences' were also reported.

As 'physical' and 'emotional' consequence perceptions significantly correlated with each other, it was not surprising that the belief of serious 'emotional consequences' also positively correlated with a longer recovery 'timeline' and more symptoms. However, it was surprising that the belief of 'emotional consequences' did not significantly correlate with the' fear of a future MI', as one would expect the fear of a future MI would correlate with 'emotional consequences'.

Although the fear of having another MI significantly correlated with the belief of serious 'physical consequences' and a longer recovery 'timeline', as 'future MI threat' was measured by one single item and the correlation scatter plots were not linear, the above interpretations should be viewed with caution.

Finally, symptom perception positively correlated with both physical and emotional consequence components. This meant that the more symptoms the patients perceived,

the more they thought that their illness would bring serious physical and emotional consequences to them, (or vice versa). As correlations do not reflect cause-effect relationships, any explanation with 'directional implication' should be dismissed.

8.6. Will MI patients' illness perceptions contribute to their moods during hospitalisation?

To examine whether illness perceptions contribute to MI patients' in-hospital moods, multivariate hierarchical regressions were conducted. As explained in Chapter 7, of the predictive variables, demographic variables entered first, followed by symptom perception and then the other illness perception components. The reason for this order was that theoretically, symptom perception triggers illness-related perceptions. Separating symptom perception from other illness perceptions would help to explore its possible role in explaining moods.

In addition, to understand whether other mood variables would further contribute to MI patients' moods, other mood variables were either (1) entered at the last step or (2) not entered. However, as negative affect and depression were conceptually similar and highly correlated, only depression was considered if both significantly correlated with the dependent variable.

8.6.1. Depression

Table 8.16 displays the final regression result on the 119 MI patients' depression. (Appendix B-6)

Table 8. 16. Hierarchical regression on the 119 MI patients' depression

Predictive Variables	β	t (118)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Block 1			0.061	0.053**	
Income	-0.048	-0.737			
Block 2			0.336	0.324	27.1***
Symptom perception	0.292	3.984***			
Block 3			0.403	0.377	5.3**
Consequence component 1: physical consequences	0.118	1.551			
Consequence component 2: emotional consequences	0.057	0.757			
Future MI threat	-0.036	-0.513			
Block 4			0.579	0.552	17.5***
State anxiety	0.353	4.390***			
Positive affect	-0.281	-4.271***			

$F_{(7, 110)} = 21.574$, $p < 0.001$

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

The MI patient's income status remained significant even after symptom perception was entered. Without considering other mood variables, demographic data and illness perceptions contributed 37.7% of the variances ($F_{(5, 112)} = 15.148$, $p < 0.001$). Their symptom perception ($p < 0.001$) and emotional consequence component ($p = 0.013$) significantly contributed to depression.

After adding state anxiety and positive affect, the final regression equation explained 55.2% of the variance of depression. Emotional consequence component was no longer significant ($p = 0.451$) but symptom perception ($p < 0.001$), state anxiety ($p < 0.001$) and positive affect ($p < 0.001$) remained significant. This suggested that those who reported more symptoms, less positive affect and higher level of anxiety tended to be more depressed.

8.6.2. State anxiety

Seven predictors were used to explain the 119 MI patients' anxiety (Table 8.17 & Appendix B-7). As one patient (ID = 50) had a high standard residual value, this patient was excluded from the final regression model.

Table 8. 17. Hierarchical regression on the 118 MI patients' state anxiety

Predictive Variables	β	t (117)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Block 1			0.252	0.246***	
Symptom perception	0.203	2.538*			
Block 2			0.392	0.365	11.9***
Consequence component 1: physical consequence	-0.152	-1.851			
Consequence component 2: emotional consequence	0.194	2.444*			
Timeline	0.080	0.886			
Future MI threat	0.123	1.497			
Block 3			0.543	0.514	14.9***
Depression	0.480	5.278***			
Positive affect	-0.022	-0.301			
$F_{(7, 109)} = 18.530$, $p < 0.001$					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Without considering other moods (depression & positive affect), symptom perception and other illness perception components accounted for 36.5% of the variance ($F_{(5, 111)} = 14.330$, $p < 0.001$), and three of them contributed significantly to state anxiety – *'symptom perception'* ($p < 0.001$), *'emotional consequences' component* ($p = 0.001$), and *'fear of future MI threat'* ($p = 0.019$). After depression and positive affect were

entered, depression became the most significant predictor ($p < 0.001$), followed by symptom perception ($p = 0.013$) and 'emotional consequences' component ($p = 0.016$). Those who were depressed, those who reported more symptoms and expected serious emotional consequences tended to be more anxious as well. However, as the residual score showed heteroscedasticity, the above conclusion should be viewed with caution.

8.6.3. Positive affect

As the MI patients' positive affect did not significantly correlate with any illness perceptions, only demographic data and mood variables were entered. In addition, one patient (case ID = 50) was excluded after showing an extreme Mahalanobis distance value (Table 8.18 & Appendix B-8).

Table 8. 18. Hierarchical regression on the 118 MI patients' positive affect

Predictive Variables	β	t (117)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Block 1			0.102	0.094***	
Caucasian (or not)	-0.289	-3.500***			
Block 2			0.273	0.254	16.0***
Depression	-0.444	-4.090***			
State anxiety	0.046	0.414			
$F_{(3, 113)} = 14.147, p < 0.001$					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Before other mood variables were considered, ethnicity (Caucasians or not) explained over 10% of the variance ($p < 0.001$). At the end, the three predictors explained 25.4% of the variance. Both ethnicity ($p = 0.001$) and depression ($p < 0.001$) significantly contributed to these patients' positive feeling. Those patients who were non-Caucasians and those who were less depressed tended to have higher positive affect.

8.6.4. Negative affect

As one MI patient (ID = 30) had a high standardised residual score and eight patients did not have data of negative affect, only 110 patients' data was used. Conceptually, because negative affect is similar to depression, depression score was therefore excluded. Overall, five predictors were entered in four separate blocks (Table 8.19 & Appendix B-9).

Table 8. 19. Hierarchical regression on the 110 MI patients' negative affect

Predictive Variables	β	t (110)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Block 1			0.102	0.093***	
Age	-0.228	-3.135**			
Block 2			0.295	0.282	18.9***
Symptom perception	0.215	2.584*			
Block 3			0.370	0.346	6.4**
Consequence component 1: physical consequence	0.005	0.065			
Consequence component 2: emotional consequence	0.160	1.895			
Block 4			0.482	0.457	11.1***
State anxiety	0.402	4.743***			
$F_{(5, 104)} = 19.383$, $p < 0.001$					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

These five predictors explained 45.7% of the total variance of negative affect. 'Age' remained significant (p = 0.002) from step one to step four. This indicated that the older the patients, the less negative affect they had.

Symptom perception (at block 2) alone explained further 18.9% of the variance of negative affect ($F_{(2, 107)} = 22.416$, $p < 0.001$). The adding of three illness perception components (symptom perception, 'physical' and 'emotional consequences' components) further explained 25.3% of variance of negative affect ($F_{(4, 105)} = 15.444$, $p < 0.001$). Both of 'emotional consequence' component (p = 0.001) and symptom perception ($p < 0.001$) significantly contributed to negative affect.

After state anxiety was entered into the regression model at the end, only 'age' (p = 0.001), symptom perception (p = 0.011) and state anxiety ($p < 0.001$) strongly contributed to negative affect. It was possible that the younger the patients, the more symptoms they reported. Also, the more anxious they felt, the higher negative affect they experienced.

Finally, the significant predictors of the 119 MI patients' moods are summarised in Table 8.20. These findings indicated that when relevant mood variables were taken into account, particularly depression and state anxiety, illness perceptions became less important, except symptom perception. Other findings were that ethnicity (Caucasian or not) was able to explain these patients' positive affect and age seemed to significantly contribute to their negative affect.

Table 8. 20. Summary of significant predictors of the 119 MI patients' moods

Dependent variable	Predictive variables in entrance order		
	1. Demographic data	2. illness perceptions	3. Moods
Depression	X	Symptoms ***	State anxiety ***; Positive affect ***
State anxiety	X	Symptoms*; emotional consequences*	Depression ***
Positive affect	Ethnicity***	X	Depression ***
Negative affect	Age **	Symptoms *	State anxiety ***

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

8.7. Conclusion

This chapter presented the 119 first-time MI patients' moods and illness perceptions during their hospitalisation. Over 48% of them reported elevated depressive symptoms and 21% had high anxiety scores. 'Stress' was the most often endorsed cause among the patients and the results of principal component analysis supported the theoretical structures of illness perceptions. Overall, negative illness perceptions, particularly serious consequences, more symptoms and future MI threat positively correlated with depression and anxiety. Multivariate analyses further revealed that negative illness perceptions contributed significantly to these patients' negative moods, if other mood variables were not considered.

CHAPTER NINE –FIRST-TIME MI PATIENTS' RESPONSES DURING THE FIRST SIX MONTHS

This chapter presents the longitudinal results of the first-time MI patients who completed all three assessments during their first 6 months post-MI. The main focus of this chapter is to address research questions and hypotheses.

9.1. Characteristic descriptions of MI patients

9.1.1. Demographic data

In total, 28 of the 119 first-time MI patients were excluded from the longitudinal analyses for the reasons listed in Table 9.1.

Table 9. 1. The reasons for excluding MI patients between three assessments

	Between time 1 to time 2	Between time 2 to time 3	Total
Died	6 (5 men & 1 female)	1	7
Did not reply	1	1	2
Dropped out	2 were too ill to continue (1 male had a stroke and 1 female had skin/arthritis problems) ; 3 (all males) withdrew (reasons: too stressful to answer questions)	4 (1 female and 3 males) withdrew (reasons: taking too much time to answer questions)	9
Moved away	----	1	1
Had angioplasty or bypass	----	3 (2 males & 1 female)had angioplasty; 6 (all males) had bypass	9

Time 1: 4-5 days after hospital admission; time 2: 4-8 weeks post-MI; time 3: 6 months post-MI

Demographic data of the MI patients who completed all three assessments

Table 9.2 displays the 91 MI patients who completed all three assessments.

Table 9. 2. The 91 MI patients' demographic data

	91 MI patients	
Gender	Males = 67 (73.62%)	Females = 24 (26.38%)
Living condition	Alone = 32 (35.16%)	Not alone = 59 (64.84%)
Ethnicity	Caucasians = 70 (76.9%)	Other = 21 (23.1%)
Partnership	With a partner = 52 (57.1%)	No partner = 39 (42.9%)
Job	Full-time = 47 (51.6%) Part-time = 4 (4.4%)	Unemployed = 8 (8.8%) Retired = 32 (35.2%)
Income	< £ 10,000 = 42 (46.2%) Not disclosed = 3 (3.3%)	≥ £ 10,001 = 46 (50.5%)

The mean age of the 91 patients was 60.12 years (SD = 12.27; range: 29 – 89; 99% CI: 56.73 – 63.51). On average, these patients had 11.24 years of education (SD = 2.76; range: 6 – 20; 99% CI: 10.48 – 12.00).

Demographic data of the MI patients who dropped out

Details of the 19 MI patients who dropped-out and their comparisons with those 91 who completed the three assessments were summarised in Table 9.3. Apart from the fact that those who completed the three assessments had more education than those who dropped-out, no other demographic information was significantly different between these two groups.

Table 9. 3. Comparisons between those completed and those dropped out from the study

	Complied (N = 91)	Non-complied (N = 19)	χ^2 / t	P
Age	Mean = 60.12 (SD = 12.28)	Mean = 63.89 (SD = 14.32)	t = -1.184	0.239
Education length	Mean = 11.24 (SD = 2.76)	Mean = 9.53 (SD = 1.58)	t = 3.693; p = 0.001 difference = 1.710 (99% CI: 0.464 – 2.956)	0.001**
Genders	Males = 67	Males = 15	$\chi^2_{(1)}$ = 0.235	0.628
Ethnicity	Caucasian = 70	Caucasian = 17	$\chi^2_{(3)}$ = 2.030	0.566
Living conditions	Living alone = 32	Living alone = 9	$\chi^2_{(1)}$ = 1.001	0.317
Spouse/partner	Yes = 52	Yes = 9	$\chi^2_{(1)}$ = 0.608	0.436
Job	Full time = 47 retired = 32 unemployed = 8 part-time = 4	Full time = 8 retired = 11	$\chi^2_{(3)}$ = 4.869	0.182
Income	≤ 10,000 = 42	≤ 10,000 = 10 ≥ 10,001 = 8 not disclosed = 1	$\chi^2_{(4)}$ = 2.761	0.599
Mean time duration between admission and 1st assessment	M = 5.23 (SD = 2.26)	M = 6.68 (SD = 2.91)	t = -2.424	0.017

Demographic data of the patients who had intrusive treatments

Table 9.4 summarises the demographic information of the nine patients who had invasive treatments and their comparisons with the 91 patients who completed three assessments. In conclusion, there was no significant difference between these two groups.

Table 9. 4. Comparisons between those completed and those had intrusive treatments

	Complied (N = 91)	Excluded (N = 9)	χ^2 / t	p
Age	M = 60.12 (SD = 12.28)	M = 58.44 (SD = 9.03)	t = 0.398	0.691
Education	M = 11.24 (SD = 2.76)	M = 11.22 (SD = 1.48)	t = 0.015	0.988
Gender	Males = 67	Males = 8	$\chi^2_{(1)} = 1.018$	0.313
Ethnicity	Caucasian = 70	Caucasian = 9	$\chi^2_{(3)} = 2.629$	0.452
Living	Living alone = 32	Living alone = 4	$\chi^2_{(1)} = 0.306$	0.580
Spouse/partner	Yes = 52	Yes = 4	$\chi^2_{(1)} = 0.536$	0.464
Job	Full time = 47 Retired = 32 Unemployed = 8 Part-time = 4	Full time = 4 Retired = 2 Unemployed = 3	$\chi^2_{(3)} = 5.367$	0.147
Income	≤ 10,000 = 42	≤ 10,000 = 5	$\chi^2_{(4)} = 4.875$	0.300
Time duration between admission and 1st assessment	M = 5.23 (SD = 2.26)	M = 5.89 (SD = 1.97)	t = -0.843	0.401

9.1.2. Medical information

This section covers the relevant medical information of the three MI patient groups.

Medical information of the patients who completed three assessments

The mean duration between admission and the first assessment was 5.23 days (SD = 2.26; range: 3 – 17; 99% CI: 4.61 – 5.85). Originally, each follow-up was tied with the patients' outpatient appointments. However, due to a difficulty of fixing outpatient appointments for these patients within the planned time schedule, this plan was replaced by home visiting and mail posting. The mean duration between the first assessment and the second assessment was 44.77 days (SD = 15.55; range: 15 – 97; 99% CI: 40.48 – 49.06). One male patient stayed in the hospital for several weeks waiting for other medical examinations. The mean time between the second assessment and the third assessment was 149.09 days (SD = 29.76; range: 96 - 245; 99% CI: 140.88 – 157.30) and there were five outliers (four males and one female). The main reasons for late replies were '*not feeling well*' (three males and one female) and '*moving to another city*' (one male).

The patients' MI sites were recorded in three categories: 16 (17.6%) patients had anterior MI, 45 (49.4%) had inferior MI and 30 (33%) had other types of MI. Of the 91 patients, 62 (68.1%) were thrombolysed at the accident & emergency (A & E) department. Before hospital discharge, 49 (53.8%) patients were smokers, 26 (28.6%) were ex-smokers and 16 (17.6%) had never smoked.

Finally, a list of physical co-morbidity and their influences on the 91 patients' life at two follow-ups were recorded in Table 9.5. Of these patients, 54 (59.3%) had family coronary heart disease history.

Table 9. 5. Summary of the 91 MI patients' co-morbidity at assessment two and three

Co-morbidity	Time 2		Time 3	
	Yes (%)	Its influence on life (% of a lot & a great deal %)	Yes (%)	Its influence on life (% of a lot & a great deal %)
Stroke	6 (6.6%)	5.5	8 (8.8%)	3.3
Hypertension	27 (29.7%)	8.8	26 (28.6%)	11.0
Diabetes	17 (18.7%)	8.8	17 (18.7%)	12.1
Cancer	1 (1.1%)	1.1	1 (1.1%)	--
Arthritis	33 (36.3%)	14.3	36 (39.6%)	18.7

Time 2: 4-8 weeks post-MI; time 3: 6-months post-MI

Medical information of the excluded MI patients

Table 9.6 illustrates comparisons between the 91 patients who completed three assessments, the 19 patients who dropped-out and the nine patients who had intrusive treatments in relation to their medical information. There was no significant difference in any of the medical information and smoking history between those who completed and those who were excluded from this study.

Table 9. 6. Comparisons of the medical information between 91 with 19 and 9 MI patients

	Complied (N = 91)	Dropped out (N = 19)	χ^2	Had intrusive treatments (N = 9)	χ^2
MI site	Anterior = 16 Inferior = 45 Other = 30	Anterior = 6 Inferior = 8 Other = 5	$\chi^2_{(2)} = 1.934 (p = 0.380)$	Anterior = 2 Inferior = 3 Other = 4	$\chi^2_{(2)} = 0.858 (p = 0.651)$
Thrombolysis	Yes = 62	Yes = 7	$\chi^2_{(2)} = 6.924 (p = 0.031)$	Yes = 5	$\chi^2_{(2)} = 1.033 (p = 0.597)$
Family coronary history	Yes = 54	Yes = 8	$\chi^2_{(2)} = 2.141 (p = 0.343)$	Yes = 8	$\chi^2_{(2)} = 6.784 (p = 0.034)$
Diabetes	Yes = 17	Yes = 5	$\chi^2_{(1)} = 0.573 (p = 0.449)$	Yes = 1	$\chi^2_{(1)} = 0.318 (p = 0.573)$
Hypertension	Yes = 19	Yes = 5	$\chi^2_{(1)} = 0.272 (p = 0.602)$	Yes = 4	$\chi^2_{(1)} = 2.568 (p = 0.109)$
Smoking	Yes = 49	Yes = 8	$\chi^2_{(2)} = 1.095 (p = 0.578)$	Yes = 5 (never smoked = 4)	$\chi^2_{(2)} = 5.531 (p = 0.063)$

9.2. What are first-time MI patients' emotional responses within the first six months post-MI?

This section describes the 91 MI patients' emotional responses over the first six months.

9.2.1. Depression

To understand the MI patients' depression in details, depression scores were examined in three ways.

One-way repeated measure ANOVA

Figure 9.1 and Table 9.7 display the mean depression scores at each assessment to examine significant changes over the first six months.

Figure 9. 1. The 91 MI patients' depression over the first six months

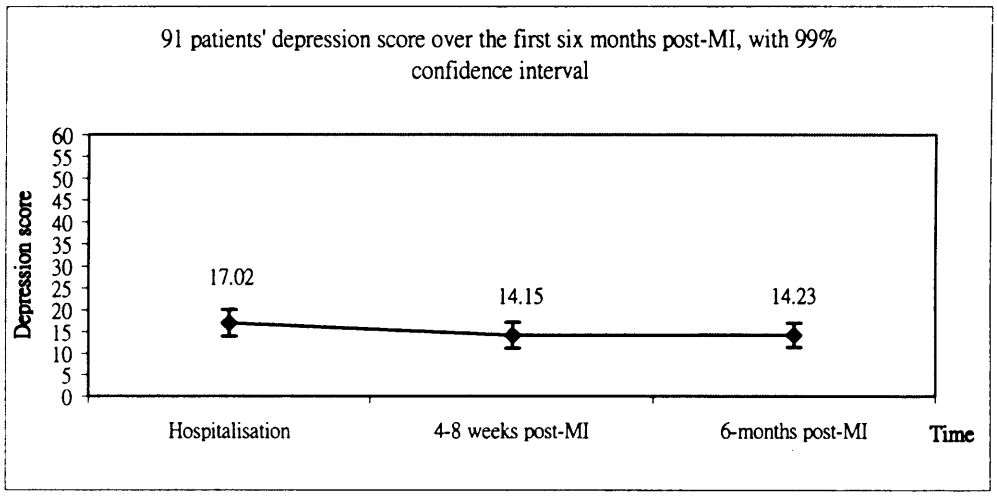


Table 9. 7. A summary of the 91 MI patients' depression over the first six months

Depression	T1	T2	T3	Mauchly's test ($\chi^2_{(df)}$)	Epsilon (Estimate of Sphericity)
mean, SD	17.02 (11.34)	14.15 (11.09)	14.23 (10.40)	$\chi^2_{(2)}$ = 6.87; p = 0.032	Greenhouse-Geisser = 0.93
F value	$F_{(1.86, 167.54)}$ = 5.30, p = 0.007				
Within subject Contrast	Linear: $F_{(1, 90)}$ = 6.88, p = 0.01				
Pairwise comparisons	T1-T2 = 2.87, p = 0.027; T1 – T3 = 2.79, p = 0.031				

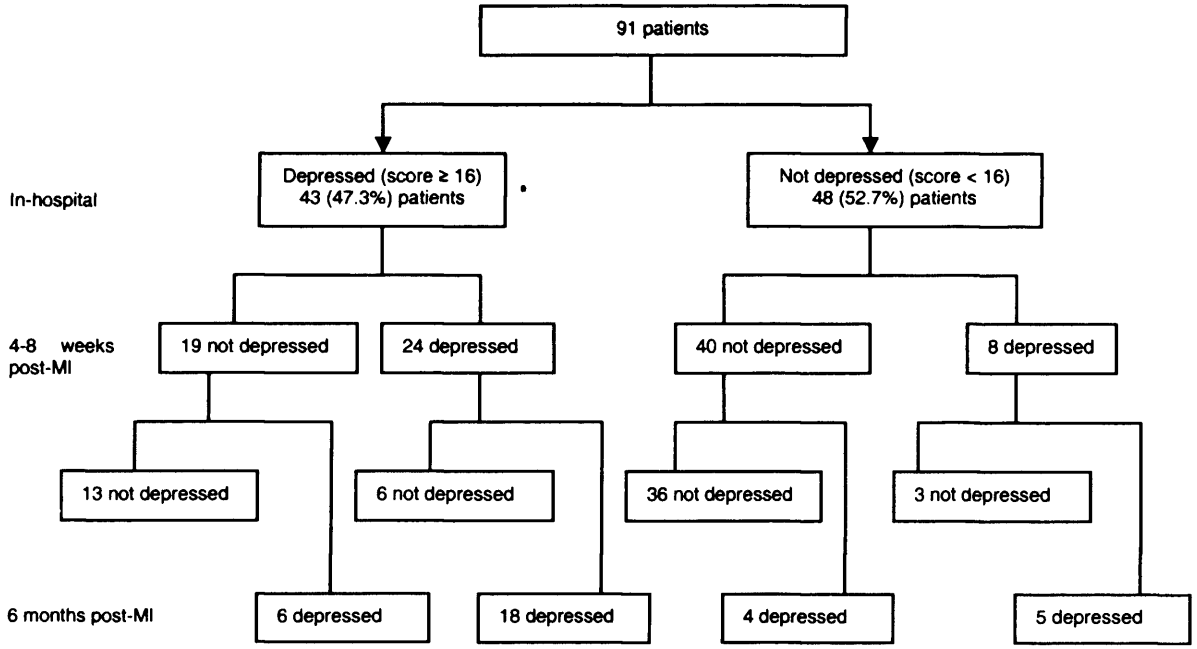
T1 = hospitalisation; T2 = 4-8 weeks post-MI; T3 = 6 months post-MI

The above information indicated that the 91 MI patients' average depression score decreased significantly over six months, although their post-hoc comparisons could not specifically identify that at which specific period the significant decrease occurred.

A tree plot for depressed vs. non-depressed MI patients

The second approach was to categorise the 91 MI patients into two groups by using a cut-off point on their depression score (≥ 16, Radloff & Locke, 1986) (Figure 9.2).

Figure 9. 2. A tree plot of the 91 MI patients' depression score over the first six months



The percentage of depressed patients from hospitalisation to six months post-MI was 47.3%, 35.2%, and 36.3%, respectively. Through the first six months, eighteen out of the 43 (44.4%) depressed patients remained depressed at each assessment and 36 out of the 48 (75%) non-depressed patients remained depression free at each assessment.

These findings implied that those who were depressed during hospitalisation tended to have a higher possibility of remaining depressed after six months. Forty-one point nine percent of those who were depressed during hospitalisation were depressed after six months. However, for those who were not depressed during hospitalisation, some may still become depressed after hospital discharge, although in this study, only nine (18.8%) patients reported depression during the first six months.

Two-way repeated measures ANOVA

Using score ≥ 16 as the cut-off point, these patients were divided into two groups and their follow-up depression scores were examined by using two-way repeated measures ANOVA. In addition, two simple repeated measures ANOVA for each group were also presented (Figure 9.3 & Table 9.8).

Figure 9. 3. A longitudinal comparison between depressed vs. non-depressed MI patients

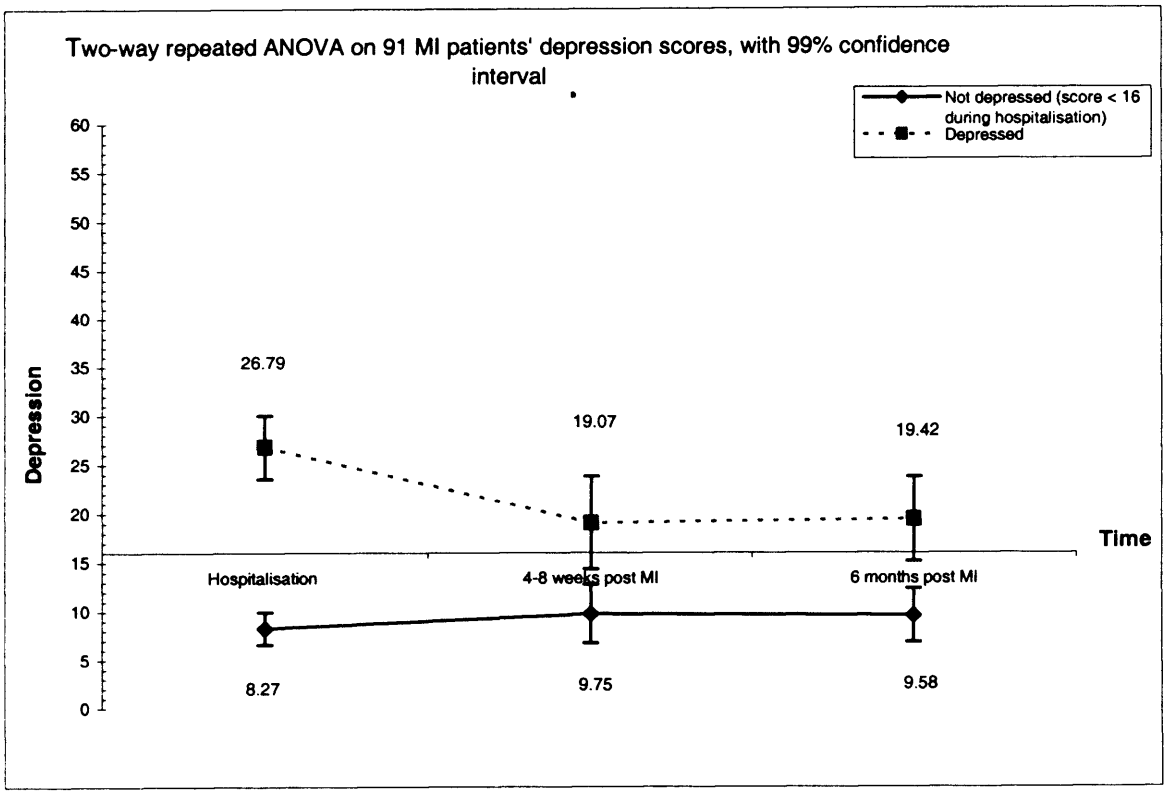


Table 9. 8. Two-way repeated measures ANOVA on the 91 MI patients' depression

Depression (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (time effect)
Low depression	8.27 (4.52)	9.75 (8.08)	9.58 (7.35)	Not depressed: $F_{(2, 84)} = 1.061$, $p = 0.356$
High depression	26.79 (8.22)	19.07 (11.99)	19.42 (10.9)	Depressed: $F_{(2, 84)} = 16.156$, $p < 0.001$; Linear trend: $F_{(1, 42)} = 20.804$, $p < 0.001$; Quadratic trend: $F_{(1, 42)} = 10.361$, $p = 0.002$ Post hoc results: T1 – T2 mean difference = 7.72, $p < 0.001$ T1 – T3 mean difference = 7.37, $p < 0.001$
F value of repeated measures ANOVA (Time, depression, time x depression)	Time: $F_{(2, 178)} = 7.234$, $p = 0.001$; Linear: $F_{(1, 89)} = 9.801$, $p = 0.002$ Depression level: $F_{(1, 89)} = 71.349$, $p < 0.001$ Interaction: $F_{(2, 178)} = 15.319$, $p < 0.001$; Linear: $F_{(1, 89)} = 20.133$, $p < 0.001$; Quadratic: $F_{(1, 89)} = 9.738$, $p = 0.002$ Post hoc: T1 – T2: mean difference = 3.121, $p = 0.005$ T1 – T3: mean difference = 3.03, $p = 0.007$ Depressed – non-depressed: mean difference = 12.56, $p < 0.001$			

T1 = hospitalisation; T2 = 4-8 weeks post-MI; T3 = 6 months post-MI;

The two-way repeated measures ANOVA showed a significant interaction between 'time' and 'depression level'. This implied that depression score not only changed over time, but the change also depended on whether the patients were depressed during hospitalisation. As 'time' and 'depression level' were both significant, this suggested that both factors had an impact on depression level over time. Post-hoc analyses further showed that depression significantly changed between time 1 vs. time 2 and time 1 vs. time 3. In addition, at the two follow-up assessments, those who were depressed during hospitalisation still reported higher depression scores than those who were not depressed at that time.

The results of simple repeated measures ANOVA within each group indicated that those who were not depressed during hospitalisation remained depression free at each assessment and their depression score did not change significantly. For those who were depressed during hospitalisation, their depression score decreased significantly from time 1 to time 2 to time 3. However, the mean score of their depression still remained higher than 16 at all three assessments.

Hypotheses testing

H1: MI patients' depression (and state anxiety) will decrease from hospitalisation to six months later.

The simple repeated measures ANOVA showed the patients' depression score decreased significantly over time. If a cut-off point (score = 16) was applied (depressed/not depressed) to the patients' baseline depression, only those who had elevated depressive symptoms during hospitalisation showed a significant decrease over time (time effect: $F_{(2, 84)} = 16.156$, $p < 0.001$), but those who were non-depressed did not change significantly over time ($F_{(2, 94)} = 1.061$, $p = 0.356$).

H2: Those patients who are depressed (using a cut-off score = 16 for the CESD, Radloff, 1977) during hospitalisation will be more likely to be still depressed at 6-month post-MI.

A number of findings support this hypothesis. First, for those who were depressed in hospital (score ≥ 16), even though their depression score decreased significantly over time, their average depression score was still higher than 16 at the second and third assessment. For those scored less than 16 at baseline, their average depression score remained stable over time. This offered the first supportive evidence.

Secondly, 55.8% of those depressed MI patients (24 out of 43 who were depressed during hospitalisation) were also depressed at the third assessment and 18 (41.9%) out of 43 depressed patients remained depressed for all three assessments. However, for those 48 patients who were not depressed in hospital, only nine (18.8%) of them felt depressed at the final assessment and only five (10.4%) of them remained depressed at the 2nd and 3rd assessment. Based on these findings, hypothesis two was supported.

9.2.2. State anxiety

The same approaches that were used to examine depression were also applied to anxiety and the cut-off point for state anxiety was set at score ≥ 50 (Fell et al., 1993).

One-way repeated measures ANOVA

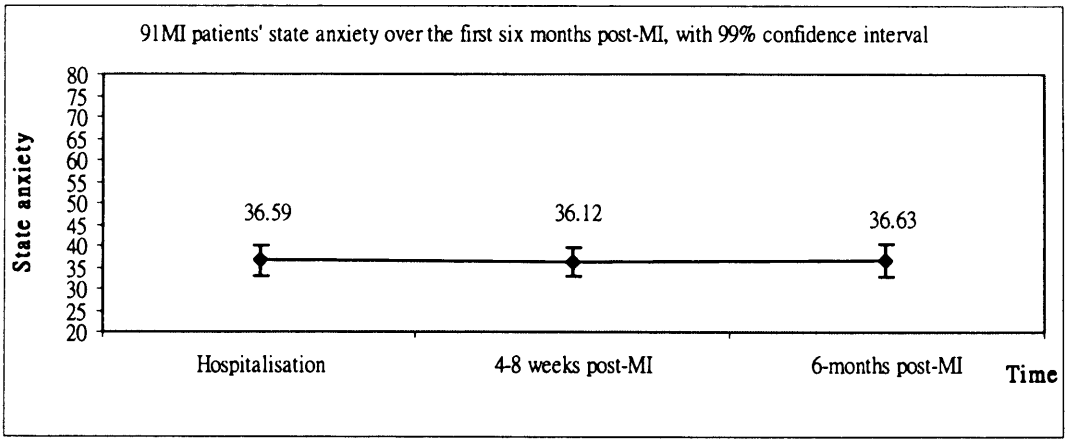
Table 9.9 & Figure 9.4 present the results from the first approach and they indicated no significant change in state anxiety over the first six months.

Table 9. 9. A summary of the 91 MI patients' state anxiety over the first six months

State anxiety	T1	T2	T3
mean, SD	36.59 (13.02)	36.12 (12.83)	36.63 (13.94)
Simple time effect	$F_{(2, 180)} = 0.093$, $p = 0.911$		

T1 = hospitalisation; T2 = 4-8 weeks post-MI; T3 = 6-month post-MI

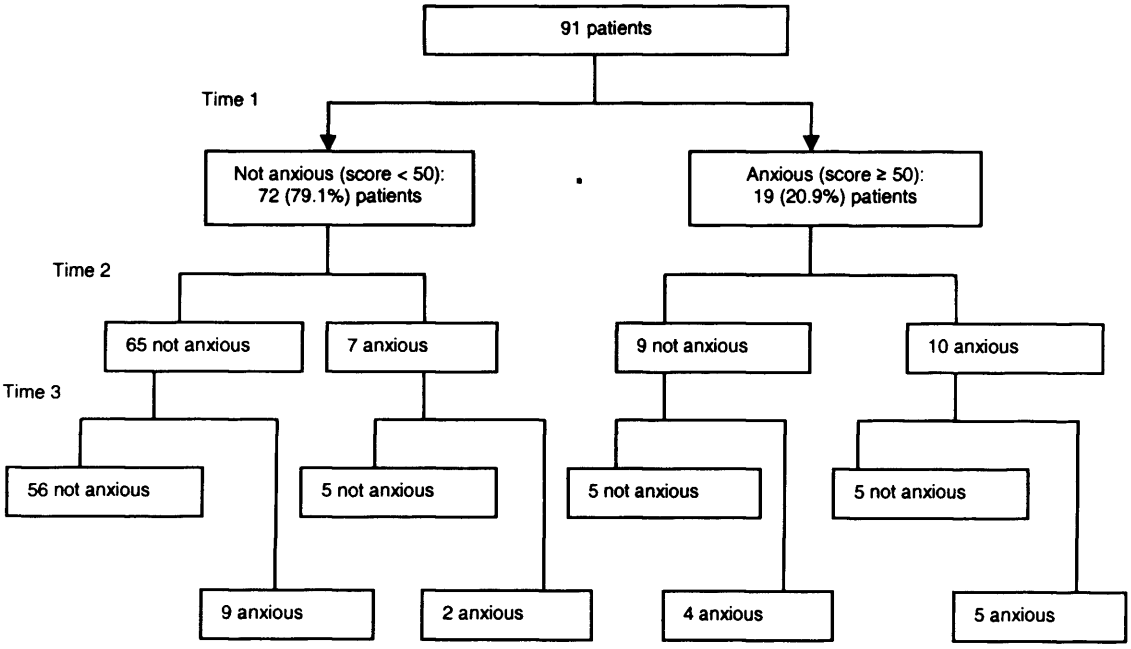
Figure 9. 4. The 91 MI patients' state anxiety over the first six months



A tree plot for anxious vs. non-anxious MI patients

Figure 9.5 displays how many MI patients reported high anxiety (≥ 50) at each assessment.

Figure 9. 5. A tree plot of the 91 MI patients' anxiety scores over the first six months



Nineteen (20.9%) patients were anxious during hospitalisation, and almost half (nine patients, 47.4%) remained anxious at six months. On the contrary, for those who were not anxious during hospitalisation, only 11 (15.3%) became anxious after six months. Of the 91 MI patients, five remained anxious at each assessment and 56 remained anxiety free.

Two-way repeated measures ANOVA

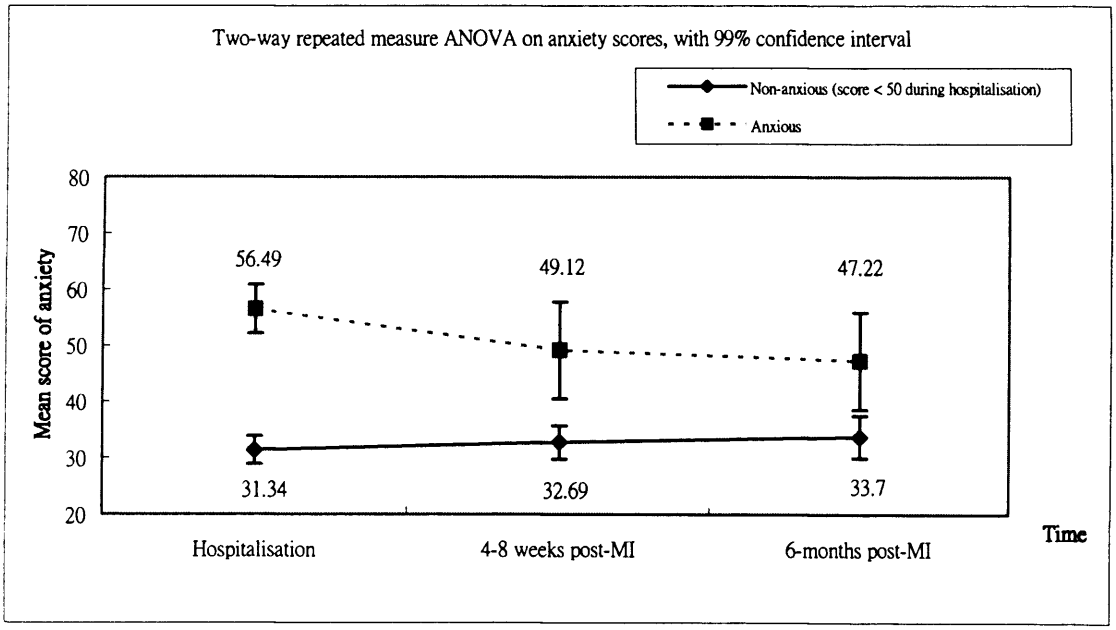
Table 9.10 and Figure 9.6 display the results of two-way repeated measures ANOVA. Two simple repeated measures ANOVA for each group are also listed.

Table 9. 10.Two-way repeated measures ANOVA on the 91 MI patients' anxiety

State anxiety (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (time effect)
Low anxiety	31.34 (8.22)	32.69 (9.86)	33.70 (12.26)	$F_{(2, 142)} = 1.495$, $p = 0.228$
High anxiety	56.49 (7.33)	49.12 (14.61)	47.22 (14.66)	$F_{(2, 36)} = 3.988$, $p = 0.027$
F value of repeated measures ANOVA (Time, anxiety, time x anxiety)	Time: $F_{(2, 178)} = 2.581$, $p = 0.078$ Anxiety level: $F_{(1, 89)} = 78.115$, $p < 0.001$ Interaction: $F_{(2, 178)} = 6.846$, $p = 0.001$; Linear: $F_{(1, 89)} = 11.347$, $p < 0.001$ Post hoc: Anxious – non-anxious: mean difference = 18.53, $p < 0.001$			

T1 = hospitalisation; T2 = 4-8 weeks post-MI; T3 = 6 months post-MI;

Figure 9. 6. A longitudinal comparison between anxious vs. non-anxious MI patients



The results indicated a significant interaction effect ('time x anxiety level') and group effect ('anxiety level'). Those with high anxiety during hospitalisation were less anxious after six months, but those with low anxiety during hospitalisation reported increased anxiety. However, after six months, those with high in-hospital anxiety were still more anxious than those who were not anxious during hospitalisation. Finally, the results of two simple repeated measures ANOVA revealed that none of the two groups showed significant changes in their anxiety over time.

Hypothesis testing

H1: MI patients' state anxiety (and depression) will decrease from hospitalisation to six months post MI.

The simple repeated measures ANOVA revealed the MI patients' anxiety level remained unchanged over time. When using a score of 50 as the cut-off point to divide the MI patients into two group, repeated measures ANOVAs indicated that both groups' anxiety level remained stable over time. Therefore, this hypothesis related to anxiety was not supported.

9.2.3. Positive affect and negative affect

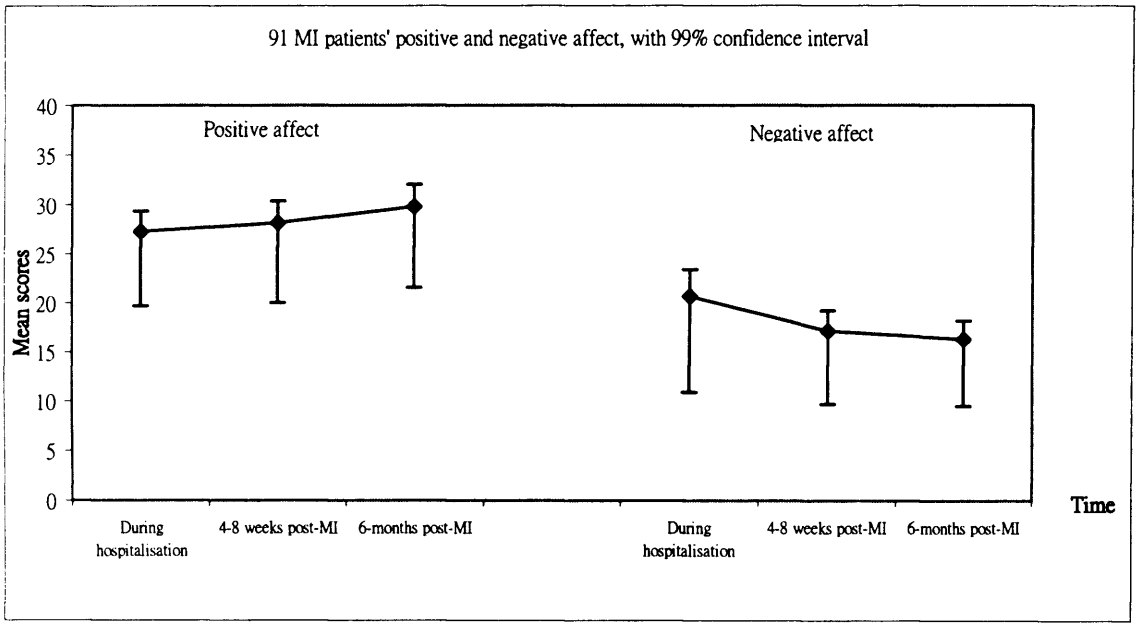
Table 9.11 and Figure 9.7 illustrate the MI patients' positive and negative affects over the first six months. "Time effect" was significant for both positive and negative affects as negative affect decreased and positive affect increased. Post hoc comparisons revealed that negative affect decreased significantly between time 1 vs. time 2 and time 1 vs. time 3. However, there was no distinguishable difference between the three assessments on positive affect.

Table 9. 11. One-way repeated measures ANOVA on the 91 MI patients' positive and negative affects

Positive & negative affect (mean, SD)	T1	T2	T3	F value of repeated measures ANOVA (Time)
Positive affect	27.27 (7.63)	28.15 (8.15)	29.80 (8.26)	Time: $F_{(2, 180)} = 4.74$, $p = 0.01$ Linear trend: $F_{(1, 90)} = 7.989$, $p = 0.06$
Negative affect	20.65 (9.74)	17.14 (7.43)	16.28 (6.75)	Maunchly's test of sphericity = $\chi^2_{(2)} = 14.747$, $p = 0.001$ Greenhouse-Geisser Epsilon = 0.86 Time: $F_{(1.72, 144.48)} = 14.659$, $p < 0.001$ Linear trend = $F_{(1, 84)} = 19.218$, $p < 0.001$ Post hoc: T1 – T2: mean difference = 3.51, $p < 0.001$ T1 – T3: mean difference = 4.37, $p < 0.001$

T1 = hospitalisation; T2 = 4-8 weeks post-MI; T3 = 6 months post-MI;

Figure 9. 7. The 91 MI patients' positive and negative affects during the first six months



In summary, the MI patients' negative affect decreased and positive affect increased over time, but their anxiety level remained stable. For those who were depressed at baseline, their depression score decreased significantly but remained higher than 16. For those non-depressed patients, their depression score remained stable and under 16.

9.3. What are first-time MI patients' illness perceptions within the first six months?

9.3.1. Causal attributions

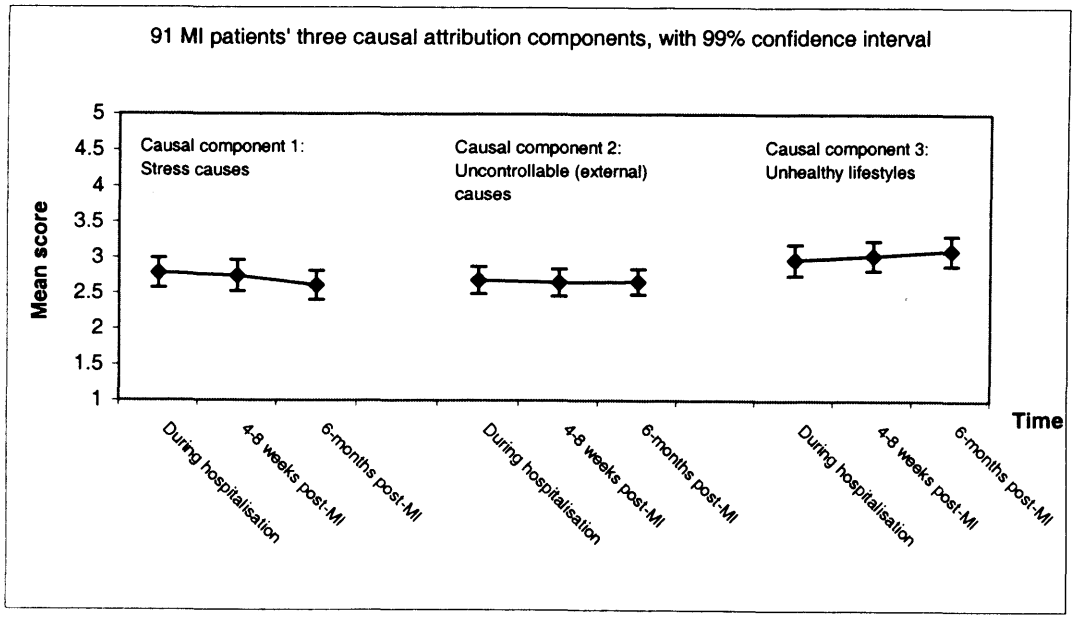
Table 9.12 and Figure 9.8 display the 91 MI patients' three causal components. None of the causal components (stress, uncontrollable causes and unhealthy lifestyles) changed significantly over the first six months post-MI.

Table 9. 12. One-way repeated measures ANOVA on the 91 MI patients' three causal components during the first six months

Causal attributions (mean, SD)	T1	T2	T3	F value of repeated measures ANOVA (Time)
Stress causes	2.78 (0.76)	2.74 (0.80)	2.61 (0.73)	Time: $F_{(2, 180)} = 3.65$, $p = 0.028$
Uncontrollable causes	2.68 (0.69)	2.65 (0.70)	2.66 (0.67)	Time: $F_{(2, 180)} = 0.079$, $p = 0.924$
Unhealthy lifestyle causes	2.97 (0.82)	3.03 (0.77)	3.10 (0.77)	Time: $F_{(2, 180)} = 1.902$, $p = 0.152$

T1 = hospitalisation; T2 = 4-8 weeks post-MI; T3 = 6 months post-MI;

Figure 9. 8. The 91 MI patients' three causal components over the first six months



Further repeated measures ANOVAs were run on 24 individual causes. Only 'stress' decreased significantly over time ($F_{(1.83,\ 164.4)} = 12.615$, $p < 0.001$). The other 23 individual causes remained unchanged.

9.3.2. Consequences, timeline, cure/control components and future MI threat

Table 9.13 and Figure 9.9 present the 91 MI patients' perceptions of illness consequences, timeline, cure/control and fear of another MI.

Table 9. 13. Repeated measures ANOVA on the 91 MI patients' illness consequences, timeline, cure/control and future MI threat

Illness perceptions (mean, SD)	T1	T2	T3	F value of repeated measures ANOVA (Time)
Consequence component 1: Physical consequences	3.08 (0.71)	2.95 (0.65)	3.00 (0.69)	Time: $F_{(2, 180)} = 2.235$, $p = 0.110$
Consequence component 2: Emotional consequences	3.34 (0.66)	3.14 (0.68)	3.10 (0.72)	Mauchly's test of Sphericity = $\chi^2_{(2)} = 6.862$, $p = 0.032$; Greenhouse-Geisser Epsilon = 0.931 Time: $F_{(1.86, 167.57)} = 6.972$, $p = 0.002$ Linear trend: $F_{(1, 90)} = 9.485$, $p = 0.003$ Post hoc: T1 – T2 mean difference = 0.20, $p = 0.008$ T1 – T3 mean difference = 0.23, $p = 0.008$
Timeline	3.08 (0.74)	3.06 (0.64)	3.29 (0.73)	Time: $F_{(2, 180)} = 7.98$, $p < 0.001$ Linear trend: $F_{(1, 90)} = 9.008$, $p = 0.003$ Post hoc: T3 – T2 mean difference = 0.23, $p = 0.001$
Control component 1: Active control	4.00 (0.55)	3.90 (0.52)	3.80 (0.53)	Time: $F_{(2, 180)} = 5.435$, $p = 0.005$ Linear trend: $F_{(1, 90)} = 10.033$, $p = 0.002$ Post hoc: T1 – T3 mean difference = 0.20, $p = 0.006$
Control component 2: Passive control	2.64 (0.73)	2.53 (0.57)	2.50 (0.59)	Mauchly's test of Sphericity = $\chi^2_{(2)} = 9.824$, $p = 0.007$; Greenhouse-Geisser Epsilon = 0.905 Time: $F_{(1.81, 162.97)} = 3.249$, $p = 0.041$
Future MI threat	3.03 (1.04)	2.93 (0.90)	2.98 (0.88)	Time: $F_{(2, 180)} = 0.388$, $p = 0.679$

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6 months post-MI

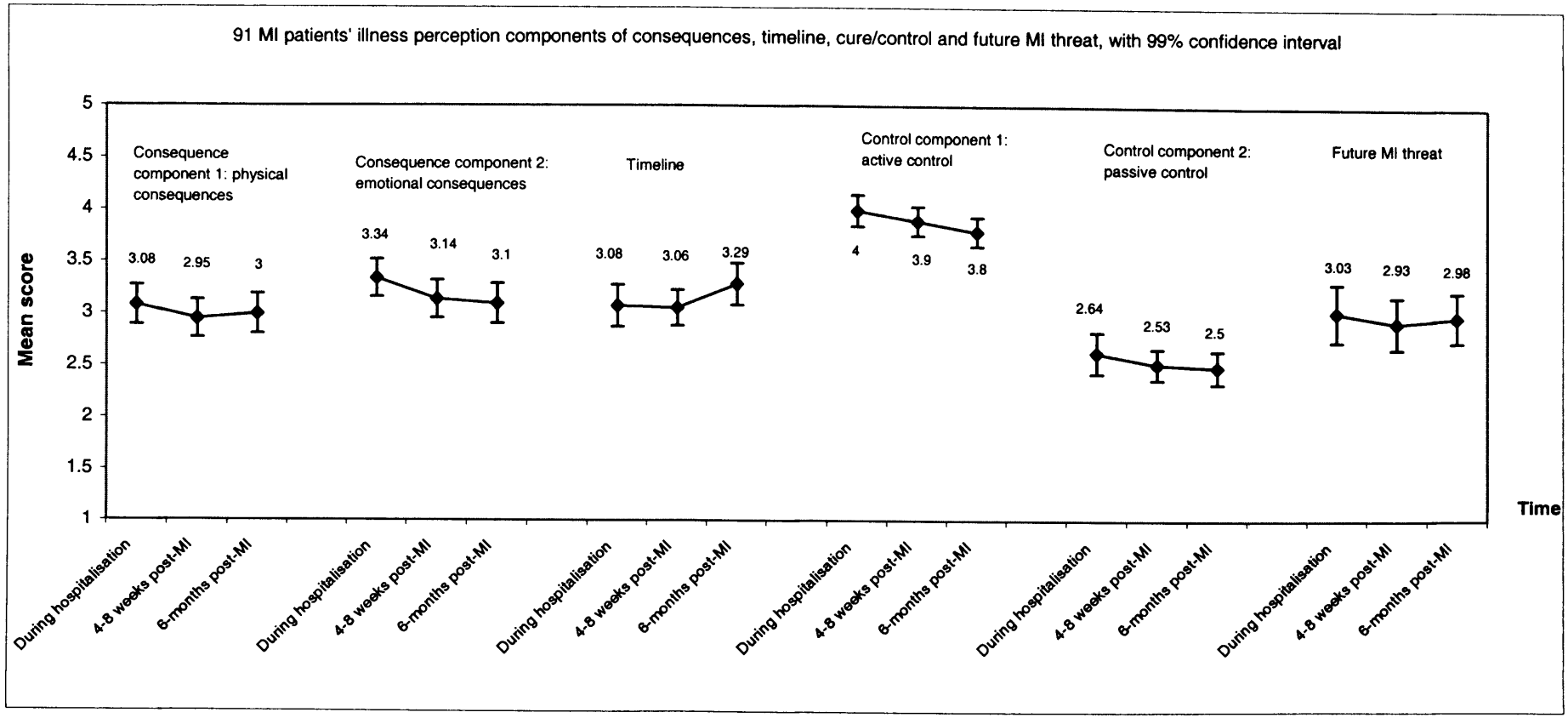
The results indicated that as time passed, the MI patients tended to strengthen their belief that their illness would last for a long time. Although by the end of the 6-month post-MI, they were less fearful that their MI would bring them serious emotional consequences, their belief in being able to control or cure MI also had weakened.

Hypothesis testing

H3: MI patients' belief that an MI will bring serious consequences will lessen over six months.

The above findings showed the MI patients' physical consequence belief was stable over time ($F_{(2, 180)} = 2.235$, $p = 0.110$). However, their emotional consequence belief decreased significantly over time ($F_{(1.86, 167.57)} = 6.972$, $p = 0.002$). Therefore, this hypothesis was partially supported.

Figure 9. 9. The 91 MI patients' illness perception components on consequences, timeline, cure/control and future MI threat over the first six months



9.3.3. Symptom perception

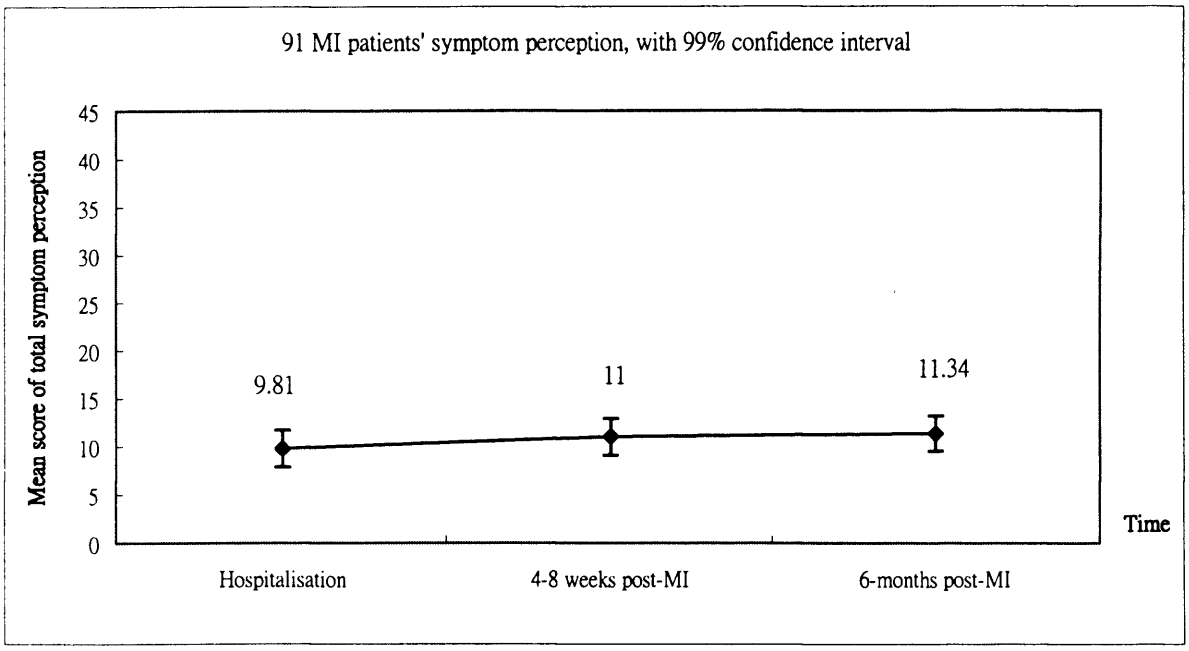
Table 9.14 and Figure 9.10 illustrate the total scores of the MI patients' symptom perception over the first six months, which were calculated by multi-response coding system. The results from simple repeated measures ANOVA and Figure 9.10 indicated that although the patients identified more symptoms which were related to their illness over time, the increase was not statistically significant.

Table 9. 14. One-way repeated measures ANOVA on the 91 MI patients' symptom perception over the first six months

Symptom perception	T1	T2	T3	Mauchly's test ($\chi^2_{(df)}$)
mean, SD	9.81 (7.05)	11.00 (7.05)	11.34 (6.77)	$\chi^2_{(2)} = 13.526$, p = 0.001
Simple time effect	Greenhouse-Geisser Epsilon = 0.876 $F_{(1.75, 157.76)} = 2.207$, p = 0.120			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6 months post-MI

Figure 9. 10. The 91 MI patients' symptom perception scores over the first six months



Overall, the MI patients' causal attributions remained stable. Their belief in 'timeline' increased significantly but their beliefs in serious emotional consequences and active control both decreased over time. Other illness perception components remained stable.

9.4. How do first-time MI patients perceive social support and what coping strategy do they use after hospital discharge?

9.4.1. Social support

Total support, special one's, family's and friends' support

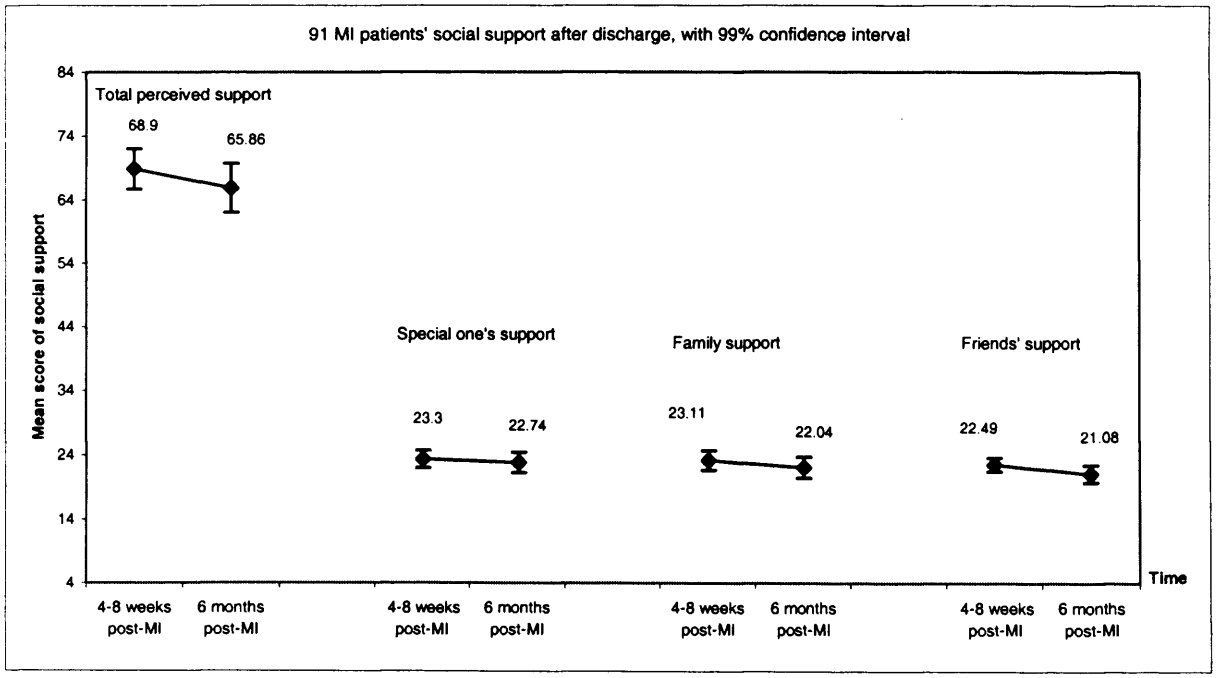
Table 9.15 and Figure 9.11 present the 91 MI patients' total perceived support and other types of support after hospital discharge. The results indicated that patients thought they received a similar amount of support from these resource groups. Their perception of a special one's support and family support did not change over time, but both of their total perceived support and friends' support decreased.

Table 9. 15. Repeated measures ANOVA on the 91 MI patients' perceived social support

Social support (mean, SD)	T2	T3	F value of repeated measures ANOVA (Time)
Total support	68.9 (11.84)	65.86 (14.37)	Time: $F_{(1, 90)} = 8.288$, $p = 0.005$, Post hoc: T2 – T3 mean difference = 3.04, $p = 0.005$
Special one's support	23.30 (5.02)	22.74 (5.85)	Time: $F_{(1, 90)} = 1.570$, $p = 0.213$
Family's support	23.11 (5.69)	22.04 (5.97)	Time: $F_{(1, 90)} = 6.116$, $p = 0.015$
Friends' support	22.49 (3.98)	21.08 (4.99)	Time: $F_{(1, 90)} = 7.95$, $p = 0.006$ Post hoc: T2 – T3 mean difference = 1.42, $p = 0.006$

T2: 4-8 weeks post-MI; T3: 6 month post-MI

Figure 9. 11. The 91 MI patients' perceived support after hospital discharge to 6-month post-MI



Perceived available support, desired support and their difference

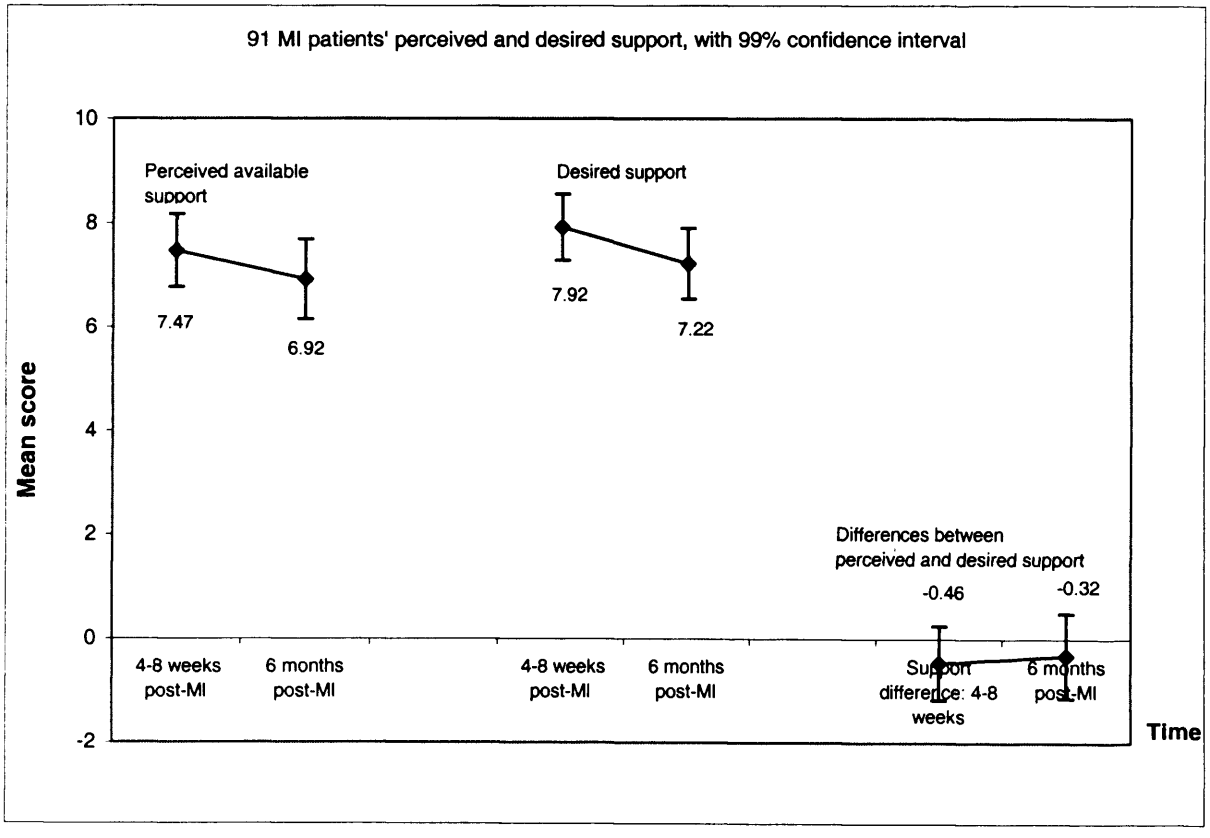
Table 9.16 and Figure 9.12 present how much support the 91 patients perceived and how much they would like between hospital discharge and 6-month post-MI.

Table 9. 16. Repeated measures ANOVA on the 91 MI patients' perceived and desired support after hospital discharge to 6-month post-MI

Perceived available vs. desired support (mean, SD)	T2	T3	F value of repeated measures ANOVA (Time)
Perceived available support	7.47 (2.59)	6.92 (2.84)	Time: $F_{(1, 90)} = 2.377$, $p = 0.127$
Desired support	7.92 (2.38)	7.22 (2.51)	Time: $F_{(1, 90)} = 4.872$, $p = 0.030$
Difference between perceived & desired support	-0.49 (2.62)	-0.32 (3.01)	Time: $F_{(1, 90)} = 0.143$, $p = 0.707$

T2: 4-8 weeks post-MI; T3: 6-month post-MI

Figure 9. 12. The 91 MI patients' perceived and desired support after hospital discharge to 6-month post-MI



Overall, the patients' perceived available support and desired support did not change significantly. Even though they seemed to expect more support from others, there was little difference between these two types of support.

9.4.2. Coping strategies

Table 9.17 & Figure 9.13 display the 91 patients' coping strategies after hospital discharge to 6-month post-MI. Only *'accepting emotional support'* coping strategy significantly decreased. The other coping strategies remained stable over time.

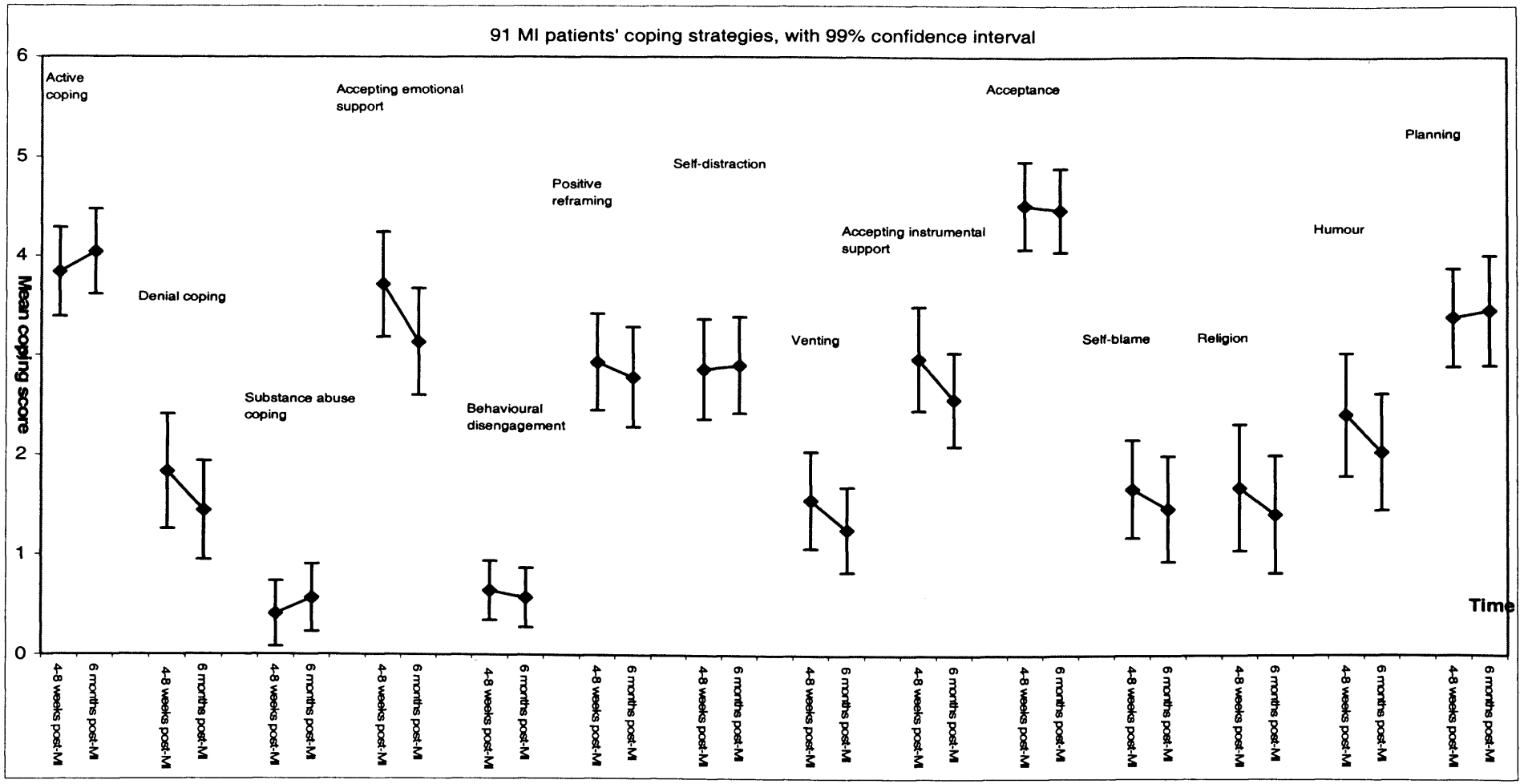
Table 9. 17. Repeated measures ANOVA on the 91 MI patients' coping strategies

Coping strategies (mean, SD)	T2		T3		F value of repeated measures ANOVA (Time)
1. Active coping	3.84 (1.66)	2nd	4.05 (1.58)	2nd	Time: $F_{(1, 90)} = 1.467$, p = 0.229
2. Denial	1.84 (2.14)		1.45 (1.86)		Time: $F_{(1, 90)} = 3.815$, p = 0.054
3. Substance abuse	0.41 (1.20)		0.57 (1.24)		Time: $F_{(1, 90)} = 1.654$, p = 0.202
4. Accepting emotional support	3.73 (1.90)	3rd	3.16 (1.95)	4th	**Time: $F_{(1, 90)} = 9.374$, p =0.003** **Post hoc : T2 – T3 mean difference = 0.56**
5. Behaviour disengagement	0.65 (1.12)		0.58 (1.13)		Time: $F_{(1, 90)} = 0.232$., p = 0.631
6. Positive reframing	2.96 (1.78)		2.81 (1.83)		Time: $F_{(1, 90)} = 0.635$, p = 0.428
7. Self-destruction	2.89 (1.85)		2.93 (1.79)	5th	Time: $F_{(1, 90)} = 0.039$, p = 0.843
8. Venting	1.57 (1.79)		1.27 (1.59)		Time: $F_{(1, 90)} = 3.263$, p = 0.074
9. Accepting instrumental support	2.99 (1.93)	5th	2.58 (1.75)		Time: $F_{(1, 90)} = 4.802$, p = 0.031
10. Acceptance	4.52 (1.64)	1st	4.47 (1.57)	1st	Time: $F_{(1, 90)} = 0.049$, p = 0.826
11. Self-blame	1.68 (1.83)		1.48 (1.97)		Time: $F_{(1, 90)} = 1.367$, p = 0.245
12. Religion	1.69 (2.34)		1.42 (2.17)		Time: $F_{(1, 90)} = 3.152$, p = 0.079
13. Humour	2.41 (2.25)		2.04 (2.13)		Time: $F_{(1, 90)} = 3.051$, p = 0.084
14. Planning	3.38 (1.82)	4th	3.45 (2.02)	3rd	Time: $F_{(1, 90)} = 0.096$, p = 0.757

T2: 4-8 weeks post-MI; T3: 6-month post-MI

In summary, the MI patients' total perceived support and friends' support decreased but special one's support and family support did not. Other than 'accepting emotional support', the patients' coping strategies remained unchanged.

Figure 9. 13. The 91 MI patients' coping strategies after hospital discharge to 6-month post-MI



9.5. Will depressed or anxious MI patients have different illness perceptions, perceived social support or coping strategies?

To explore whether depressed or anxious MI patients held different illness perceptions, perceived social support or coping strategies at each assessment, independent t-tests were conducted, with significant results listed in Table 9.18-19. (Appendix C-1 – C-6)

Table 9. 18. The significant comparison results between depressed and not depressed MI patients at each assessment

	Depressed (SD)	Not depressed (SD)	Depressed – not depressed (99% CI)	t	p
During patients' hospitalisation -					
Consequence component 1: Physical consequences	3.38 (0.65)	2.82 (0.67)	0.55 (0.19 – 0.92)	3.988	< 0.001
Consequence component 2: Emotional consequences	3.58 (0.57)	3.12 (0.66)	0.46 (0.12 – 0.80)	3.534	0.001
Symptom perception	13.02 (7.56)	6.94 (5.11)	6.09 (2.46 – 9.71)	4.446	< 0.001
At 4-8 weeks post-MI -					
Causal attribution component 1: Stress	3.16 (0.67)	2.51 (0.77)	0.65 (0.22 – 1.08)	4.011	< 0.001
Consequence component 1: Physical consequences	3.24 (0.73)	2.80 (0.55)	0.44 (0.08 – 0.79)	3.198	0.002
Consequence component 2: Emotional consequences	3.52 (0.65)	2.93 (0.60)	0.59 (0.23 – 0.94)	4.324	< 0.001
Symptom perception	15.47 (7.22)	8.58 (5.68)	6.89 (2.95 – 10.83)	5.018	< 0.001
Denial coping	2.63 (2.25)	1.41 (1.97)	1.22 (0.02 – 2.42)	2.679	0.009
Venting coping	2.34 (1.93)	1.15 (1.57)	1.19 (0.21 – 2.18)	3.182	0.002
Self blame coping	2.63 (1.83)	1.17 (1.62)	1.46 (0.48 – 2.44)	3.911	< 0.001
At 6-month post-MI -					
Causal attribution component 1: Stress	2.89 (0.68)	2.46 (0.71)	0.43 (0.03 – 0.83)	2.802	0.006
Consequence component 1: Physical consequences	3.38 (0.60)	2.79 (0.64)	0.59 (0.23 – 0.95)	4.303	< 0.001
Consequence component 2: Emotional consequences	3.57 (0.59)	2.84 (0.65)	0.73 (0.37 – 1.09)	5.297	< 0.001
Symptom perception	14.48 (6.23)	9.55 (6.45)	4.93 (1.28 – 8.59)	3.552	0.001
Denial coping	2.18 (2.24)	1.03 (1.46)	1.15 (-0.02 – 2.31)	2.637	0.010
Self blame coping	2.27 (2.30)	1.03 (1.62)	1.24 (0.03 – 2.45)	2.735	0.009
Planning coping	4.18 (1.78)	3.03 (2.05)	1.15 (0.06 – 2.23)	2.689	0.009

In general, the depressed MI patients held more negative perceptions in relation to worse 'physical consequences' and 'emotional consequences'. They had more symptoms at each assessment than those who were not depressed. Also, those who had a high number of depressive symptoms tended to attribute 'stress' and 'family problems/worries' as MI causes at time 2 and time 3. The depressed MI patients also used more 'denial' and 'self-blame' coping strategies at both two follow-up assessments.

Table 9. 19. The significant comparison results between anxious and not anxious MI patients at each assessment

	Anxious (SD)	Not anxious (SD)	Anxious – not anxious (99% CI)	t	p
During patients' hospitalization - Consequence component 2: Emotional consequences	3.75 (0.54)	3.23 (065)	0.52 (0.09 – 0.94)	3.213	0.002
Timeline	3.52 (0.69)	2.96 (0.71)	0.55 (0.07 – 1.03)	3.042	0.003
Symptom perception	15.95 (6.94)	8.19 (6.16)	7.75 (3.46 – 12.05)	4.750	< 0.001
Future MI threat	3.63 (0.90)	2.88 (1.02)	0.76 (0.08 – 1.43)	2.945	0.004
At 4-8 weeks post-MI - Consequence component 1: Physical consequences	3.41 (0.44)	2.85 (0.65)	0.56 (0.21 – 0.92)	4.323	< 0.001
Consequence component 2: Emotional consequences	3.61 (0.50)	3.03 (0.67)	0.58 (0.18 – 0.97)	3.980	< 0.001
Symptom perception	16.12 (7.75)	9.82 (6.37)	6.30 (1.59 – 10.99)	3.525	0.001
At 6-month post-MI - Consequence component 1: Physical consequences	3.41 (0.61)	2.89 (0.67)	0.52 (0.08 – 0.96)	3.138	0.002
Consequence component 2: Emotional consequences	3.62 (0.52)	2.96 (0.70)	0.66 (0.21 – 1.10)	3.905	<0.001
Timeline	3.66 (0.69)	3.19 (0.71)	0.47 (0.00 – 0.94)	2.631	0.010
Symptom perception	15.70 (5.97)	10.11(6.50)	5.59 (1.33 – 9.85)	3.453	0.001
Future MI threat	3.45 (0.95)	2.85 (0.82)	0.60 (0.04 – 1.17)	2.813	0.006
Substance abuse coping	1.20 (1.85)	0.39 (0.95)	0.81 (0.01 – 1.61)	2.652	0.009
Venting	2.05 (1.85)	1.06 (1.44)	0.99 (-0.03 – 2.02)	2.551	0.012

Overall, the anxious MI patients tended to believe in worse 'physical consequences', 'emotional consequences' and reported more symptoms. They also believed their illness would last longer, and they had a stronger fear of future MI.

Although there was no significant coping difference between the anxious and not anxious MI patients at 4-8 weeks post-MI, at the final assessment, those who used 'substance' to cope tended to be more anxious.

9.6. Will MI patients' illness perceptions, social support and coping correlate with their moods?

This section aims to examine the relationship of the MI patients' moods with their illness perceptions, social support and coping.

9.6.1. Correlations between MI patients' illness perceptions and moods

The significant correlations between the MI patients' moods and illness perceptions are presented in Table 9.20 for cross-sectional correlations and Table 9.21 for longitudinal correlations (Appendix C-7 & C-8).

Table 9.20 showed the correlation patterns of moods and illness perceptions at each assessment. Both 'consequences' components and symptom perception consistently (positively) correlated with the MI patients' negative moods at each assessment. At the two follow-ups, 'stress' causal component and 'fear of another MI' also significantly (positively) correlated with negative moods. In general, those who believed their MI would bring serious consequences, those who reported more symptoms and those who feared for another MI tended to show higher levels of depression, state anxiety or negative affect at the same time.

Furthermore, at both hospitalisation and 4-8 weeks post-MI, anxiety positively correlated with illness timeline. Although during this time, the stronger they believed in longer recovery timeline, the more anxious they felt, by the time of the 6-month post-MI, this correlation was no longer significant. It indicated that after six months, the MI patients probably had got used to their illness or had some understanding of their illness. Therefore, their anxiety level did not significantly correlate with illness timeline anymore.

Table 9. 20. The significant correlations between the 91 MI patients' moods and illness perceptions at three assessments

	Hospitalisation				4-8 weeks post-MI					6-month post-MI				
	Depression	State anxiety	Positive affect	Negative affect		Depression	State anxiety	Positive affect	Negative affect		Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress Causes					Causal component 1: Stress Causes	0.455***	0.406***		0.436***	Causal component 1: Stress Causes	0.290**	0.348***		0.347***
Causal component 2: Uncontrollable/ External Causes					Causal component 2: Uncontrollable/ External Causes					Causal component 2: Uncontrollable/ External Causes				
Causal component 3: Unhealthy Lifestyles/ behaviours					Causal component 3: Unhealthy Lifestyles/ behaviours					Causal component 3: Unhealthy Lifestyles/ behaviours				
Consequence component 1: Physical Consequences	0.415***	0.338***		0.387***	Consequence component 1: Physical Consequences	0.459***	0.374***		0.382***	Consequence component 1: Physical Consequences	0.405***	0.409***		0.295**
Consequence component 2: Emotional Consequences	0.429***	0.428***		0.458***	Consequence component 2: Emotional Consequences	0.498***	0.467***		0.438***	Consequence component 2: Emotional Consequences	0.472***	0.498***	-0.272**	0.348***
Timeline	0.288**	0.434***			Timeline		0.293**			Timeline				
Control component 1: Active control					Control component 1: Active control					Control component 1: Active control			0.330***	
Control component 2: Passive control					Control component 2: Passive control	0.363***				Control component 2: Passive control				
Future MI threat		0.444***			Future MI threat	0.271**				Future MI threat	0.317**	0.370***	-0.353***	
Symptom perception	0.549***	0.470***		0.461***	Symptom perception	0.588***	0.502***		0.529***	Symptom perception	0.475***	0.432***	-0.326**	0.392***

** $p \leq 0.01$; *** $p \leq 0.001$

Table 9. 21. The significant correlations between the 91 MI patients' moods and illness perceptions over the first six months

Hospitalisation Illness cognition	Patients' state mood after 4-8 weeks (2nd assessment)			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress				
Causal component 2: External				
Causal component 3: Lifestyle				
Consequence component 1: Physical	0.396***			0.319**
Consequence component 2: Emotional	0.468***	0.362***		0.398***
Timeline		0.278**		
Control component 1: Active control				
Control component 2: Passive control				
Future MI threat	0.272**			
Symptom perception	0.406***		-0.292**	0.330***

Hospitalisation Illness cognition	Patients' state mood after six months (3rd assessment)			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress				
Causal component 2: External		-0.287**		
Causal component 3: Lifestyle				
Consequence component 1: Physical	0.296**	0.273**		
Consequence component 2: Emotional	0.295**	0.312**		
Timeline		0.279**		
Control component 1: Active control				0.307**
Control component 2: Passive control				
Future MI threat	0.294**	0.361***		
Symptom perception	0.363***			0.284**

4-8 weeks post-MI Illness cognition	Patients' state mood after six months (3rd assessment)			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	0.318**	0.332***		0.365***
Causal component 2: External				
Causal component 3: Lifestyle				
Consequence component 1: Physical	0.354***	0.385***		
Consequence component 2: Emotional	0.371***	0.437***		0.298**
Timeline		0.368***	-0.273**	
Control component 1: Active control				
Control component 2: Passive control	0.284**			
Future MI threat	0.336***	0.352***	-0.314**	
Symptom perception	0.438***	0.338***		0.301**

** $p \leq 0.01$; *** $p \leq 0.001$

Table 9.21 indicated that over the first six months post-MI, both 'consequences' components at baseline maintained significantly correlated with the patients' negative moods at the later stages. Even at 4-8 weeks post-MI, these two consequence components still had significant correlations with patients' negative moods. Similar correlation patterns were found in 'future MI threat' and symptom perception.

Hypotheses testing

H4: Those patients with strong perceptions that their MI will bring serious consequences would be more depressed and anxious.

As the patients' depression and state anxiety both strongly (positively) correlated with their perceptions of 'physical consequences' and 'emotional consequences' at each assessment. This hypothesis was accepted.

H5: Those patients who believe they cannot control their MI would be more depressed and anxious.

As the MI patients' 'active control' perception did not significantly correlate with their depression and state anxiety at any of the assessments and their 'passive control' perception only significantly correlated with depression at 4-8 weeks post-MI, this hypothesis could only be partially supported.

H6: Those patients who believe their illness will last a long time would be more depressed and anxious.

During the patients' hospitalisation and the follow-up at 4-8 weeks post-MI assessment, those patients who believed in longer illness 'timeline' also reported higher levels of depression or/and anxiety. However, these correlations were not significant at 6-month post-MI. Therefore, this hypothesis was only supported during hospitalisation and at 4-8 weeks post MI.

H7: The correlation patterns between patients' illness perceptions and post-MI moods will be similar at each assessment.

Although the correlation patterns were not exactly the same at each assessment, based on the following findings:

- The patients' 'uncontrollable (external)' causal perception and 'unhealthy lifestyles' causal perception did not significantly correlate with any of the moods at each assessment.
- The patients' 'physical' and 'emotional consequences' perceptions and symptom perception continued to be correlated with their depression, state anxiety and/or negative affect at each assessment.

- Only the patients' stress causal perception, 'timeline', 'passive control' and 'fear of future MI' perceptions did not have consistent and significant correlations with the moods at each assessment. Even so, 'stress' causal component still showed consistent correlations with depression and anxiety at the second and third assessment, and 'fear of future MI' also correlated with either depression or state anxiety at each assessment.

This hypothesis was therefore supported.

Further information about MI patients' moods and illness perceptions

As it is important to understand the interrelationships of MI patients' moods and illness perceptions, Appendix C-9 and Appendix C-10 listed correlations within the MI patients' moods and illness perceptions. In summary, the MI patients' negative moods were highly (positively) correlated with each other at each assessment, and the correlation patterns were similar between these assessments.

The MI patients' 'stress' attribution and 'unhealthy lifestyle' attribution tended to positively correlate. Stress attribution also positively correlated with patients' emotional and physical consequence beliefs. Those who believed their MI was caused by some uncontrollable causes tended to believe they can not control it, but the more they believed that unhealthy lifestyles caused their MI, the more they believed something could be done to improve it. Furthermore, the more symptoms they reported, the stronger beliefs they had in serious consequences. Finally, the stronger they believed their illness would last a long time, the worse consequences and more fear they perceived. .

9.6.2. Correlations between MI patients' social support, coping and moods

Social support and moods

None of the measured social support correlated with the MI patients' moods at 4-8 weeks post-MI. At 6-month post-MI, the total perceived support negatively correlated with state anxiety ($r = -0.276$, $p = 0.008$). The special one's support positively correlated with their positive affect ($r = 0.282$, $p = 0.007$) (Appendix C-11).

Coping and moods

Table 9.22 displays the significant correlations of the MI patients' coping strategies and moods (Appendix C-12).

Table 9. 22. The significant correlations between the 91 MI patients' moods and coping strategies at two follow-ups

4-8 weeks post-MI coping strategy	91 patients' moods at 4-8 weeks post-MI			6-months post-MI coping strategy	91 patients' moods at 6-month post-MI		
	Depression	Positive affect	Negative affect		Depression	State anxiety	Negative affect
Active		0.333***		Active			
Denial	0.300**		0.388***	Denial	0.351***		0.314**
Substance	0.326**			Substance			
Disengage	0.277**		0.320**	Disengage	0.356***	0.329***	0.407***
Positive reframing		0.380***		Positive reframing			
Venting	0.371***		0.323**	Venting	0.428***	0.310**	0.403***
Self blame	0.411***		0.390***	Self blame	0.456***	0.329***	0.393***
Religion			0.266**	Religion	0.302**		0.290**
Planning			0.286**	Planning	0.290**		0.338**

***: $p < 0.001$; **: $p < 0.01$

In general, denial, behaviour disengagement, venting, self-blame and substance abuse positively correlated with the patients' negative moods. Active coping and positive reframing only positively correlated with their positive affect at 4-8 weeks post-MI. Five strategies (accepting emotional support, accepting instrumental support, acceptance, using humour and self-distraction) did not correlate with any moods. Surprisingly, planning coping and religion coping not only did not positively correlate with the patients' positive affect, but positively correlated with their negative affect (and depression).

Hypothesis testing

H11: MI patients who use more problem-focused coping strategies (i.e. active coping, planning, positive reframing, acceptance and seeking instrumental support) will report less depression and anxiety after hospital discharge to 6-month post-MI.

According to Carver (1997), 'active', 'planning', 'positive reframing', 'acceptance', and 'using instrumental support' coping strategies are generally regarded as adaptive coping strategies. In this study, active coping and positive reframing both had positive correlations with positive affect at the second assessment. However their correlations were not significant at the third assessment. 'Acceptance' and 'accepting instrumental

support' did not significantly correlate with the patients' positive affect at both follow-up assessments. However, 'planning coping' not only did not positively correlate with patients' positive affect, instead, it positively correlated with their negative affect at both follow-up assessments. Therefore, findings in this study did not support this hypothesis.

9.6.3. Further information about MI patients' illness perceptions with social support and coping

The Common Sense Model of Illness (CSMI) proposes that illness perceptions will guide people's coping actions and appraisals. In the case of MI, it will be important to understand whether patients' perceptions of their illness will correlate with their coping strategies. In addition, as social support is correlated to coping and even been regarded as coping resources (Thoits, 1986), it is also important to explore its relationship with illness perceptions. Appendix C-13 and C-14 listed the full correlation coefficients between illness perceptions with coping and social support at two follow-ups. A summary of the significant correlations is on Table 9.23.

Table 9. 23. The significant correlations between the 91 MI patients' illness perceptions with social support and coping at assessment two and three

	Patients' illness perceptions and time 2					
Time 2 social support -	Causal component 1: Stress	Consequence component 1: physical	Timeline	Control component 2: passive	Future MI threat	
Total perceived support			-0.285**		-0.299**	
Special one's support					-0.296**	
Family support			-0.273**			
Friends' support		-0.282**	-0.326**		-0.312**	
Time 3 coping - Denial				0.304**		
Self-distraction	0.268**					
Self blame	0.400***					
Planning		0.306**				

	Patients' illness perceptions at time 3						
Time 3 social support -	Causal component 1: stress	Causal component 2: external causes	Consequence component 2: emotional	Timeline	Control component 1: active	Control component 2: passive	Symptom perception
Total perceived support					0.298**		
Friends' support	-0.288**	-0.270**	-0.292**		0.345***		
Time 3 coping - Active					0.367***		
Denial	0.276**	0.271**					
Substance abuse							0.341***
Behaviour disengagement							0.306**
Positive reframing				-0.303**	0.273**		
Self blame						0.276**	

** $p \leq 0.01$; *** $p \leq 0.001$

Unfortunately, there was no clear correlation pattern between the MI patients' illness perception and social support/coping. It was very difficult to make a conclusion.

Section 9.6 has described the relationships between the MI patients' moods and their illness perceptions, social support and coping during the first six months. The final data suggested that the MI patients' negative illness perceptions positively correlated with their negative moods and the more they believed in unhealthy lifestyle causes, the stronger they believed they could try to improve the situation. Social support did not strongly correlate with the patients' moods. Although active coping and positive reframing positively correlated with the patients' positive affect at time 2, others 'adaptive' coping strategies such as acceptance and using instrumental support did not. As predicted, denial, disengagement, venting and self-blame significantly correlated with worse negative moods, but planning coping and religion coping also positively correlated with worse negative moods.

9.7. Will social support or coping strategies mediate illness perceptions and moods?

To test whether social support or coping strategies mediate illness perception components and moods, the groups of variables (dependent variable, mediator, predictor) ≈ (mood, social support/coping, illness perceptions) which significantly correlated with each other were selected to test mediating effects.

9.7.1. The mediating effects of coping strategy at 4-8 weeks post-MI

9.7.1.1. Coping mediating illness perception components and depression

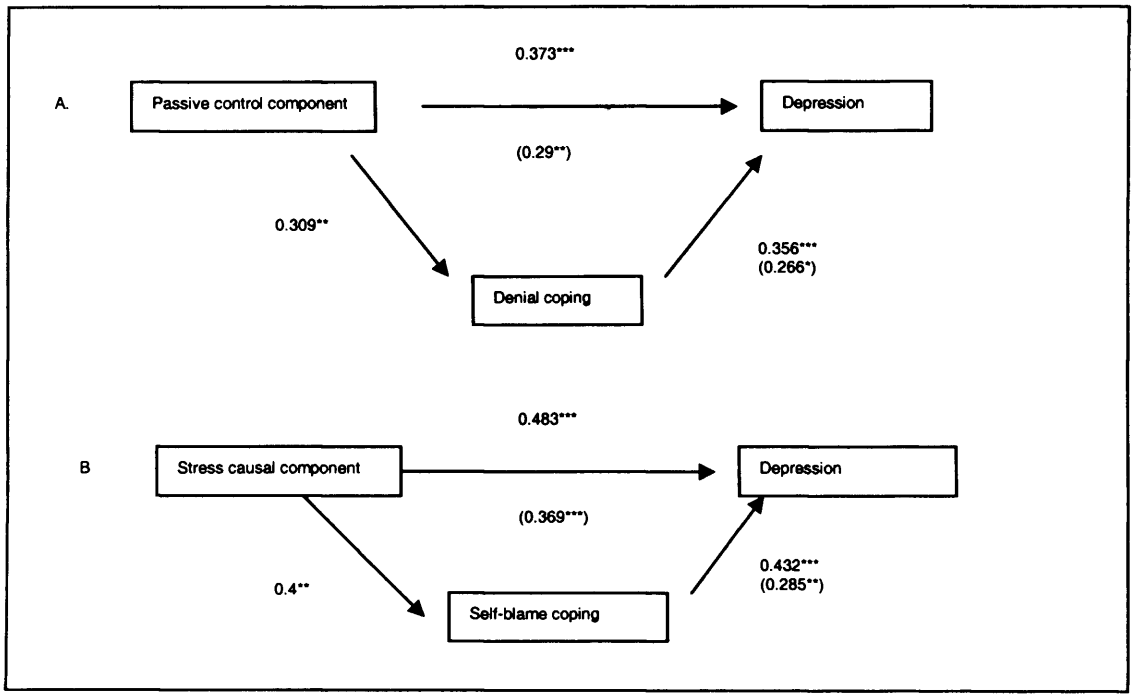
Table 9.24 displays each testing step on how two coping strategies (denial & self-blame) mediated two types of illness perception components ('passive control' component & 'stress' causal component) and depression at 4-8 weeks post-MI. After using the Sobel test (Sobel, 1988), Figure 9.14 further displays the direct and indirect relationships between illness perception components, coping strategies and depression. P value was set at ≤ 0.05 for the significance in the Sobel test.

Table 9. 24. The mediating effects of coping on illness perceptions and depression at 4-8 weeks post-MI

Depression at 4-8 weeks post-MI	β	t (90)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'denial coping' on 'belief in passive control' and depression at 4-8 weeks post-MI –				
Step 1: using 'passive control' component to predict depression F (1, 88) = 14.203, p < 0.001	0.373	3.769***, p < 0.001	0.139	0.129
Step 2: using 'passive control' component to predict 'denial' coping - F (1, 88) = 9.321, p = 0.003	0.309	3.053**, p = 0.003	0.096	0.086
Step 3: using 'denial' coping to predict depression - F (1, 88) = 12.796, p = 0.001	0.356	3.577***, p = 0.001	0.127	0.117
Step 4: using 'passive control' component & 'denial' to predict depression -			0.203	0.185
Passive control component	0.290	2.885**, p = 0.005		
Denial coping	0.266	2.647**, p = 0.010		
F (2, 87) = 11.091, p < 0.001	Subject ID = 110 was excluded due to high standard residual scores			
Sobel test result: partial mediation (Sobel z value = 1.999, p = 0.045); Standardised coefficient of 'passive control' component on depression: Direct = 0.29; indirect = 0.083				
	β	t (90)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'self-blaming coping' on 'stress' causal component and depression –				
Step 1: using 'stress' causal component' to predict depression F (1, 88) = 26.727, p < 0.001	0.483	5.170***, p < 0.001	0.233	0.224
Step 2: using 'stress' causal component to predict 'self-blame' coping - F (1, 88) = 16.77, p < 0.001	0.4	1.095***, p < 0.001	0.160	0.151
Step 3: using 'self-blame' coping to predict depression - F (1, 88) = 20.203, p < 0.001	0.432	4.495***, p < 0.001	0.187	0.177
Step 4: using 'stress' causal component & 'self-blame' to predict depression -			0.301	0.285
Stress causal component	0.369	3.771***, p < 0.001		
Self-blame coping	0.285	2.909**, p = 0.005		
F (2, 87) = 18.729, p < 0.001	Subject ID = 110 was excluded due to high standard residual scores			
Sobel test result: partial mediation (Sobel z value = 2.374, p = 0.017); Standardised coefficient of 'stress' causal component on depression: Direct = 0.369; indirect = 0.114				

**: p ≤ 0.01; ***: p ≤ 0.001

Figure 9. 14. The mediating paths between illness perception components, coping and depression at 4-8 weeks post-MI



Overall, it was confirmed that 'denial' partially mediated the 91 MI patients' passive control perception and depression, as the direct effect between passive control and depression, with 'denial coping' included, was 0.29. The indirect effect, although not big, pointed out 0.083 as the amount of the original correlation between passive control and depression that went through the mediator ("denial" coping) to depression.

Similarly, 'self-blame' coping was confirmed to partially mediate the 'stress' causal component and depression, as the direct correlation between them was 0.369 and the indirect correlation coefficient was 0.114.

9.7.1.2. Coping mediating illness perception components and negative affect

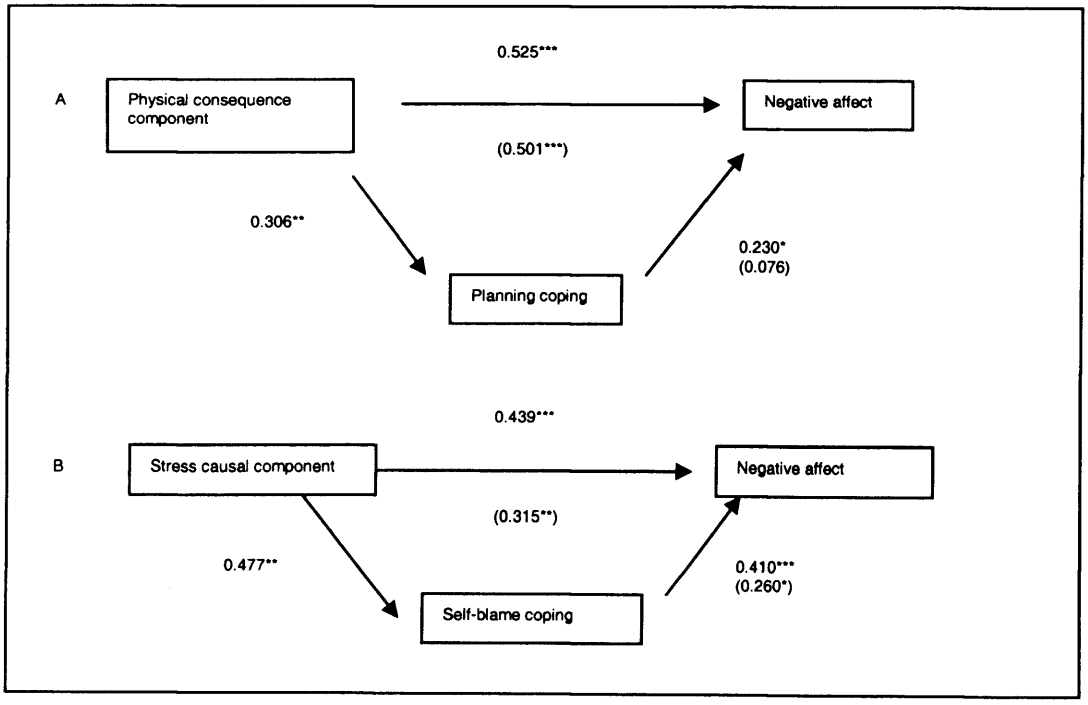
To test to what extent coping (planning & self-blame) strategies mediate illness perception components ('physical consequences' component & 'stress' causal component) and negative affect, Table 9.25 and Figure 9.15 display regression results and mediating paths.

Table 9. 25. The mediating effects of coping on illness perceptions and negative affect at 4-8 weeks post-MI

Negative affect at 4-8 weeks post-MI	β	t (88)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'planning coping' on 'physical consequences' component and negative affect –				
Step 1: using 'physical consequences' component to predict negative affect - F (1, 86) = 32.654, p < 0.001	0.525	5.714***, p < 0.001	0.275	0.267
Step 2: using 'physical consequences' component to predict 'planning' coping - F (1, 86) = 8.853, p = 0.004	0.306	2.975**, p = 0.004	0.093	0.083
Step 3: using 'planning coping' to predict negative affect - F (1, 86) = 4.785, p = 0.031	0.230	2.188*, p = 0.031	0.053	0.042
Step 4: using 'physical consequences' component & 'planning' coping to predict negative affect -			0.281	0.264
Physical consequence component	0.501	5.188***, p < 0.001		
Planning coping	0.076	0.791, p = 0.431		
F (2, 85) = 16.569, p < 0.001	Three subjects ID = 9, 33, & 110 were excluded due to high standard residual scores			
Sobel test result: No mediation (Sobel z value = 0.763, p = 0.445); Standardised coefficient of 'physical consequences' component on negative affect: Direct = 0.501; indirect = 0.024				
	β	t (87)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'self-blaming coping' on 'stress' causal component and negative affect –				
Step 1: using 'stress' causal component to predict negative affect - F (1, 85) = 20.279, p < 0.001	0.439	4.503***, p < 0.001	0.193	0.183
Step 2: using 'stress' causal component to predict 'self-blame coping' - F (1, 85) = 25.001, p < 0.001	0.477	5.000***, p < 0.001	0.227	0.218
Step 3: using 'self-blame coping' to predict negative affect - F (1, 85) = 17.153, p < 0.001	0.410	4.142***, p < 0.001	0.168	0.158
Step 4: using 'stress' causal component & 'self-blame' to predict negative affect -			0.245	0.227
Stress causal component	0.315	2.922**, p = 0.004		
Self-blame coping	0.260	2.406*, p = 0.018		
F (2, 84) = 13.605, p < 0.001	Four subjects ID = 23, 33, 103, 110 were excluded due to high standard residual scores			
Sobel test result: Partial mediation (Sobel z value = 2.167, p = 0.030); Standardised coefficient of 'stress' causal component on negative affect: Direct = 0.315; indirect = 0.124				

** p ≤ 0.01; ***: p ≤ 0.001

Figure 9. 15. The mediating paths between illness perception components, coping and negative affect at 4-8 weeks post-MI



Although the regression results supported that planning coping might mediate the MI patients' physical consequence perception and negative affect, the Sobel test could not confirm it.

In terms of the mediating effect of 'self-blame' coping on 'stress' causal component and negative affect, the Sobel test showed a partial mediating effect, as the direct effect was 0.315 and the indirect effect was 0.124.

9.7.2. The mediating effects of coping strategy at 6-month post-MI

The mediating effect of 'behaviour disengagement' coping was tested on the MI patients' symptom perception and their three types of negative moods (depression, state anxiety and negative affect). Table 9.26 and Figure 9.16 present the testing results and mediating paths. The results reveal all of the three Sobel z values were too small ($p > 0.05$). Therefore even in the regression analyses, adding 'behaviour disengagement' did decrease the contribution of symptom perception, the final conclusion was that none of the mediating effects was significant.

Table 9. 26. The mediating effects of coping on symptom perception and negative moods at 6 months post-MI

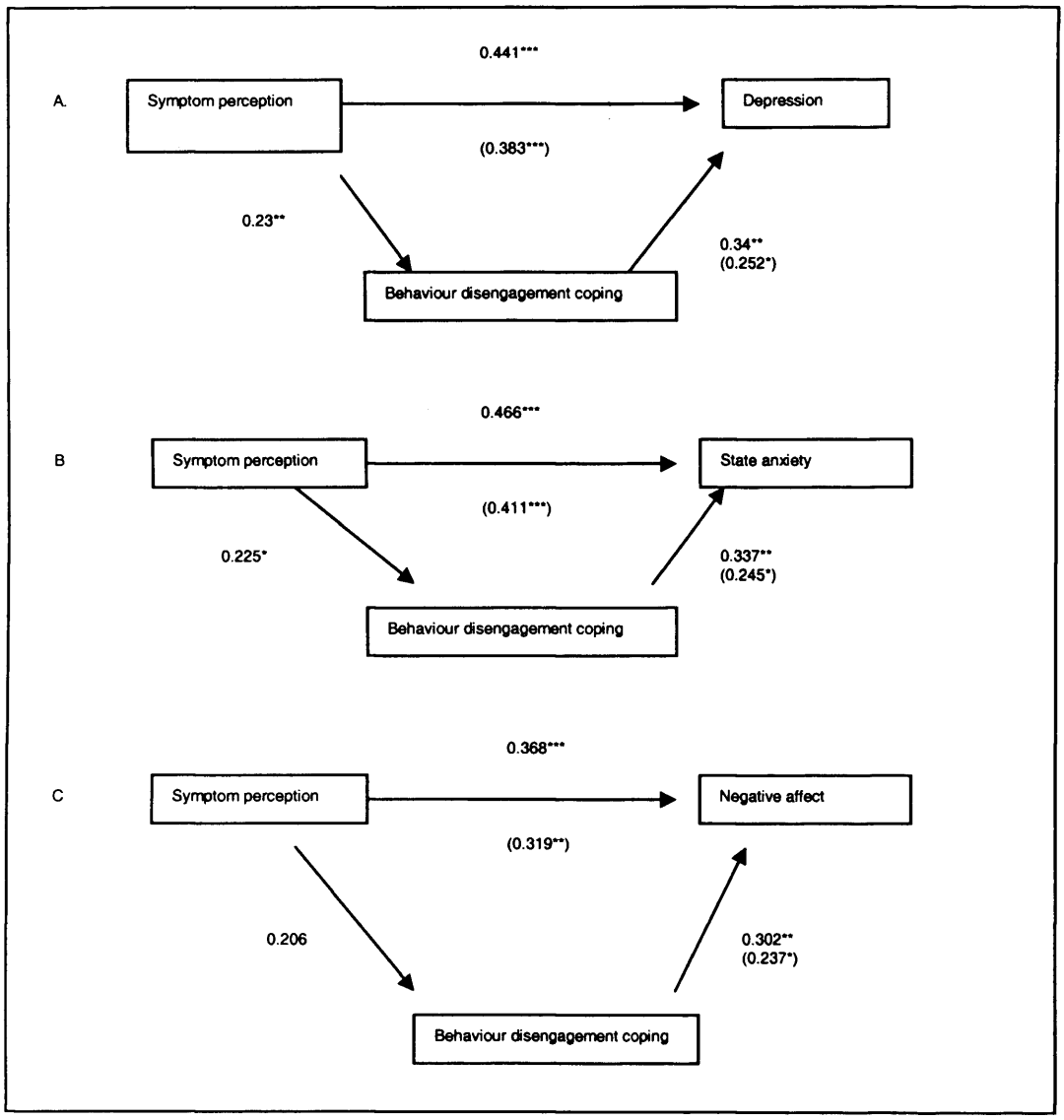
Moods at 6-month post-MI	β	t (87)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'behaviour disengagement coping' on 'symptom' perception and depression –				
Step 1: using 'symptom' perception to predict depression - F (1, 85) = 20.571, p < 0.001	0.441	4.536***, p < 0.001	0.195	0.185
Step 2: using 'symptom' perception to predict 'behaviour disengagement coping' - F (1, 85) = 4.765, p = 0.032	0.230	2.183*, p = 0.032	0.053	0.042
Step 3: using 'behaviour disengagement coping' to predict depression - F (1, 85) = 11.142, p = 0.001	0.340	3.338***, p = 0.001	0.116	0.105
Step 4: using 'symptom' perception & 'behaviour disengagement' to predict depression -			0.255	0.237
Symptom perception	0.383	3.961***, p < 0.001		
Behaviour disengagement coping	0.252	2.605*, p = 0.011		
F (2, 84) = 14.379, p < 0.001	Four subjects ID = 88, 101, 104 & 110 were excluded due to high standard residual scores			
Sobel test result: No mediation (Sobel z value = 1.687, p = 0.09); Standardised coefficient of 'symptom' perception on depression: Direct = 0.383; indirect = 0.058				

	β	t (86)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'behaviour disengagement coping' on 'symptom' perception and state anxiety –				
Step 1: using 'symptom' perception to predict state anxiety - F (1, 84) = 23.361, p < 0.001	0.466	4.833***, p < 0.001	0.218	0.208
Step 2: using 'symptom' perception to predict 'behaviour disengagement coping' - F (1, 84) = 4.482, p = 0.037	0.225	2.117*, p = 0.037	0.051	0.039
Step 3: using 'behaviour disengagement coping' to predict state anxiety - F (1, 84) = 10.776, p = 0.001	0.337	3.283***, p = 0.001	0.114	0.103
Step 4: using 'symptom' perception & 'behaviour disengagement' to predict state anxiety -			0.274	0.257
Symptom perception	0.411	4.287***, p < 0.001		
Behaviour disengagement coping	0.245	2.549*, p = 0.013		
F (2, 83) = 15.693, p < 0.001	Five subjects ID = 11, 88, 101, 104 & 110 were excluded due to high standard residual scores			
Sobel test result: No mediation (Sobel z value = 1.671, p = 0.09); Standardised coefficient of 'symptom' perception on state anxiety: Direct = 0.411; indirect = 0.055				

	β	t (87)	Cumulative R^2	Cumulative adj. R^2
Testing the mediating effect of 'behaviour disengagement coping' on 'symptom' perception and negative affect –				
Step 1: using 'symptom' perception to predict negative affect - F (1, 85) = 13.322, p < 0.001	0.368	3.650***, p < 0.001	0.135	0.125
Step 2: using 'symptom' perception to predict 'behaviour disengagement coping' - F (1, 85) = 3.764, p = 0.056	0.206	1.940, p = 0.056	0.042	0.031
Step 3: using 'behaviour disengagement coping' to predict negative affect - F (1, 85) = 8.547, p = 0.004	0.302	2.924**, p = 0.004	0.091	0.081
Step 4: using 'symptom' perception & 'behaviour disengagement' to predict negative affect -			0.189	0.170
Symptom perception	0.319	3.181**, p = 0.002		
Behaviour disengagement coping	0.237	2.355*, p = 0.021		
F (2, 84) = 9.791, p < 0.001	Four subjects ID = 73, 88, 101, 104 were excluded due to high standard residual scores			
Sobel test result: No mediation (Sobel z value = 1.458, p = 0.14); Standardised coefficient of 'symptom' perception on negative affect: Direct = 0.319; indirect = 0.049				

** p ≤ 0.01; *** p ≤ 0.001

Figure 9. 16. The mediating paths between symptom perception, behaviour disengagement coping and negative moods at 6-month post-MI



Hypotheses testing

H13: Perceived total support would mediate the perception of 'illness consequences' and post-MI depression.

As none of the patients' social support significantly correlated with both of their illness perceptions and moods, social support could not be used to test mediating effects between illness perceptions and post-MI moods.

H14: 'Denial' coping strategy would mediate 'illness control' perception and post-MI depression.

At the second assessment, 'denial' coping strategy partially mediated the patients' 'passive control' perception and 'depression'. However, denial coping did not show any significant mediating effect on 'control' perception and depression. Therefore, hypothesis fourteen was partially supported.

Findings in section 9.7 summarised that social support did not mediate the MI patients' illness perceptions on moods at both time 2 and time 3. At time 2, denial partially mediated the MI patients' passive control on depression, and self-blame partially mediated stress causal attribution on depression and negative affect. Otherwise, coping did not mediate illness perceptions and moods at time 3.

9.8. What are the roles of illness perceptions, social support and coping in relation to moods? A multivariate approach to first-time MI patients' moods

This section examines to what extent illness perceptions, social support and coping contributed to the MI patients' moods over the first six months. Hierarchical regressions were applied and the entering orders of predictors were 'demographic data', 'symptom perception', 'other illness perception components', 'coping and social support', and finally 'other mood variables'.

When using the in-hospital variables to predict the patients' moods at 6-month post-MI, the same type of mood at baseline (in hospital) was entered in two different ways: (1) it was entered before the demographic data, or (2) it was entered at the end with the other in-hospital mood variables. These two different orders would enable exploring the contribution of the in-hospital moods to the moods after six months.

As mentioned earlier in Chapter 8, depression and negative affect were conceptually similar. Therefore, these two variables were not entered together in the same regression analysis.

9.8.1. Multivariate analyses of the MI patients' moods at each assessment

9.8.1.1. Depression

Table 9.27 describes the regression results on depression at three assessments.

Table 9. 27. The regression results of the MI patients' depression at each assessment

In-hospital depression	β	t (91)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
In-hospital predictors:					
Block 1			0.301	0.293	
In-hospital symptom perception	0.255	3.149**			
Block 2			0.401	0.373	8.0**
In-hospital consequence component 1: physical consequences	0.154	1.872			
In-hospital consequence component 2: emotional consequences	0.093	1.115			
In-hospital timeline	-0.079	-0.980			
Block 3			0.605	0.577	20.4***
In-hospital state anxiety	0.354	4.038***			
In-hospital positive affect	-0.333	-4.603***			
F (6, 84) = 21.431, p < 0.001					
Depression at 4-8 weeks post-MI	β	t (90)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
4-8 weeks predictors:					
Block 1			0.113	0.093	
Patients' gender	0.168	2.449*			
Patients' income status (< £10001 or not)	-0.105	-1.446			
Block 2			0.382	0.360	26.7***
4-8 weeks post-MI symptom perception	0.096	1.216			
Block 3			0.551	0.507	14.7***
4-8 weeks post-MI causal component 1: stress	0.089	1.139			
4-8 weeks post-MI consequence component 1: physical	0.042	0.431			
4-8 weeks post-MI consequence component 2: emotional	0.160	1.544			
4-8 weeks post-MI control component 2: passive control	0.112	1.615			
4-8 weeks post-MI future MI threat	0.103	1.612			
Block 4			0.702	0.651	14.4***
4-8 weeks post-MI denial coping	0.098	1.319			
4-8 weeks post-MI substance abuse	0.194	2.777**			
4-8 weeks post-MI behaviour disengagement	0.050	0.691			
4-8 weeks post-MI venting	0.087	1.159			
4-8 weeks post-MI self-blame	0.103	1.329			
Block 5			0.751	0.700	4.9***
4-8 weeks post-MI state anxiety	0.290	3.764***			
4-8 weeks post-MI positive affect	-0.017	-0.262			
F (15, 74) = 14.842, p < 0.001	Ps. subject ID = 110 was excluded due to high standard residual score				
Depression at 6 months post-MI	β	t (91)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
6-month predictors:					
Block 1			0.225	0.217	
6-month post-MI symptom perception	0.161	1.985			
Block 2			0.323	0.283	6.6*
6-month post-MI causal component 1: stress	-0.031	-0.440			
6-month post-MI consequence component 1: physical	-0.012	-0.128			
6-month post-MI consequence component 2: emotional	0.001	0.008			
6-month post-MI future MI threat	0.053	0.725			
Block 3			0.511	0.443	16.0***
6-month post-MI denial coping	0.141	1.897			
6-month post-MI behaviour disengagement	0.002	0.030			
6-month post-MI venting	0.011	0.130			
6-month post-MI self-blame	0.144	2.049*			
6-month post-MI religion coping	0.137	1.833			
6-month post-MI planning	0.033	0.505			
Block 4			0.728	0.682	23.9***
6-month post-MI state anxiety	0.627	7.708***			
6-month post-MI positive affect	0.047	0.660			
F (13, 77) = 15.831, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

During hospitalisation

During hospitalisation, symptom perception, state anxiety and positive affect were the only significant predictors of depression. Those who perceived more symptoms, feeling more anxious or less positive tended to feel more depressed. When entering their symptom perception first, it alone explained over 29.3% of the variance. Although the other three illness perception components added 8% of the variance, none of their individual contribution was significant. This was probably due to the high correlations between symptom perception and other illness perception components.

However, the most important predictors probably were the patients' state anxiety and positive affect. Even after illness perceptions were controlled for, they still contributed another extra 20.4% of the variance. Considering that symptom perception, state anxiety and depression were significantly (positively) correlated and the fact that after partitioning out their common variance, state anxiety still contributed significantly, one would suggest that state anxiety probably was the post important contributor to depression followed by positive affect and then symptom perception.

At 4-8 weeks post-MI

When demographic data (gender & income) were considered, only income status was significant. The less income they had, the more depressed they were. Symptom perception further explained 26.7% of the variance, and at this step, income status and symptom perception became significant contributors. After adding other illness perception components, another 14.7% of variance was explained. In total, illness perceptions explained 41.4% of the variance and at that stage, symptom perception, together with emotional consequence component and income status, remained significant predictors.

After entering coping strategies, another 14.4% of the variance was explained. Substance abuse coping, gender and emotional consequence perception were particularly important. Finally, when other mood variables were entered, an extra 4.9% of the variance was added. At this stage, none of the illness perceptions was significant, but state anxiety, substance abuse coping and gender were the three most significant predictors. Those who felt more anxious, those who often used other stuff (i.e. alcohol,

sleeping pills), and those who were females tended to feel more depressed at 4-8 weeks post-MI.

At 6-month post-MI

Six months after the MI onset, except for state anxiety, other significant predictors had emerged. When symptom perception was entered first, it accounted for 21.7% of the variance and remained significant even after other illness perception components were entered. The other illness perceptions accounted for another 6.6% of the variance, but none of them was significant. At step 2, the patients' illness perceptions explained over 28.3% of the variance.

Coping explained another 16.0% of the variance. However, when illness perceptions and coping were all considered, self-blame coping strategy and symptom perception became the only two significant predictors. Finally, when other mood variables were entered, state anxiety became the most significant predictor, followed by self-blame coping (& symptom perception, $p = 0.051$). Those who felt more anxious and those who blamed themselves tended to be more depressed. Although other predictors only contributed a little, the contribution of illness perceptions and coping was significant. Finally, all these predictors were able to explain 68.2% of the variance.

Overall, no matter during hospitalisation or after six months, state anxiety remained to be the most significant predictor over time. Although not all of the illness perception components were significant, illness perceptions were always able to explain at least 30% of the depression variance and 'symptom' perception seemed to be the most important illness perception component. The change of significant coping strategy from 'substance abuse' at 4-8 weeks to 'self-blame' at six months also indicated that these patients did not use the same types of coping strategies over time.

9.8.1.2. State anxiety

Table 9.28 displays the MI patients' anxiety at each assessment.

Table 9. 28. The regression results of the MI patients' state anxiety at each assessment

In-hospital state anxiety:	β	t (91)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Time 1 predictors:					
Block 1			0.077	0.067	
Patients' income status (< £10001 or not)	-0.154	-1.973			
Block 2			0.263	0.246	17.9***
In-hospital symptom perception	0.161	1.781			
Block 3			0.477	0.440	19.4***
In-hospital consequence component 1: physical	-0.055	-0.615			
In-hospital consequence component 2: emotional	0.158	1.764			
In-hospital timeline	0.103	1.034			
In-hospital future MI threat	0.262	2.897**			
Block 4			0.562	0.520	8.0***
In-hospital depression	0.421	3.941***			
In-hospital positive affect	0.101	1.143			
F (8, 82) = 13.171, p < 0.001					
State anxiety at 4-8 weeks post-MI	β	t (91)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
4-8 weeks predictors:					
Block 1			0.252	0.244	
4-8 weeks post-MI symptom perception	0.112	1.121			
Block 2			0.336	0.297	5.3*
4-8 weeks post-MI causal component 1: stress	0.055	0.586			
4-8 weeks post-MI consequence component 1: physical	-0.080	-0.697			
4-8 weeks post-MI consequence component 2: emotional	0.094	0.715			
4-8 weeks post-MI timeline	0.131	1.463			
Block 3			0.520	0.486	18.9***
4-8 weeks post-MI depression	0.564	5.668***			
F (6, 84) = 15.159, p < 0.001					
State anxiety at 6-month post-MI	β	t (91)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
6-month predictors:					
Block 1			0.079	0.069	
Patients' age	-0.203	-3.108**			
Block 2			0.249	0.231	16.2***
6-month post-MI symptom perception	-0.023	-0.281			
Block 3			0.372	0.327	9.6**
6-month post-MI causal component 1: stress	0.029	0.412			
6-month post-MI consequence component 1: physical	0.002	0.019			
6-month post-MI consequence component 2: emotional	0.092	0.920			
6-month post-MI future MI threat	0.035	0.484			
Block 4			0.454	0.386	5.9*
6-month post-MI behaviour disengagement	0.032	0.442			
6-month post-MI venting	-0.031	-0.420			
6-month post-MI self-blame	-0.044	-0.581			
6-month post-MI perceived total support	-0.051	-0.739			
Block 5			0.712	0.667	28.1***
6-month post-MI depression	0.665	7.750***			
6-month post-MI positive affect	-0.172	-2.417*			
F (12, 78) = 16.054, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

During hospitalisation

'Income status' was significant at the first step. After symptom perception was entered, only symptom perception was significant and it added 17.9% of the variance. When other illness perception components were added to the regression model, another 19.4% of the variance was explained. At this step (step 3), the 'fear of another MI', symptom perception, emotional consequence component and income status were all significant contributors, and illness perceptions explained 37.3% of the variance. Only when other mood variables were entered, did it become clear that depression was the most salient predictor, followed by the 'fear of future MI'. Income status became a borderline significant predictor ($p = 0.052$).

At 4-8 weeks post-MI

At 4-8 weeks post-MI, depression became the only significant predictor. Although none of the illness perception components was significant, they still explained 29.7% of the variance. In fact, before depression was entered, symptom perception ($p = 0.002$) was the key contributor.

At 6-month post-MI

Six months after the MI event, depression was still the most important predictor of anxiety, followed by the patients' age and their positive affect. Among the older patients, those who were depressed and those who had a higher level of positive affect tended to feel less anxious. Although none of the illness perception components was significant, if they were entered before other mood variables, they could still explain 31.7% of the variance. In fact, when only age and symptom perception were considered, both variables were significant predictors. Therefore, maybe because the patients' illness perceptions shared a lot of common variance, the unique contribution of symptom perception became less obvious after other mood variables were entered.

In summary, although depression was the most significant predictor over the first six months, illness perception components always contributed at least 25% to 37% of the total variance. As none of the coping strategies predicted the patients' state anxiety, it was possible that the coping strategies measured in this study referred to more long-

term, repeatedly used strategies. Therefore, none of them could really explain state anxiety.

9.8.1.3. Positive affect

Table 9.29 presents the cross-sectional positive affect from assessment one to six months post-MI.

Table 9. 29. The regression results of the MI patients' positive affect at each assessment

In-hospital positive affect	β	t (91)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Time 1 predictors:					
Block 1			0.206	0.188	
Patients' ethnicity (Caucasians or not)	-0.344	-3.952***			
Patients' income status (< £10001 or not)	0.188	2.147*			
Block 2			0.392	0.364	17.6***
In-hospital depression	-0.532	-4.951***			
In-hospital state anxiety	0.203	1.819			
F (4, 86) = 13.888, p < 0.001					
Positive affect at 4-8 weeks post-MI	**β**	**t (91)**	**Cumulative R^2**	**Cumulative adj. R^2**	**Incremental adj. R^2 (%)**
4-8 weeks predictors:					
Block 1			0.142	0.122	
Patients' ethnicity (Caucasians or not)	-0.118	-1.239			
Patients' income status (< £10001 or not)	0.196	1.978			
Block 2			0.267	0.233	11.1***
4-8 weeks post-MI active coping	0.127	1.239			
4-8 weeks post-MI positive reframing	0.292	2.934**			
Block 3			0.298	0.257	2.4
4-8 weeks post-MI depression	-0.188	-1.948			
F (5, 85) = 7.218, p < 0.001					
Positive affect at 6-month post-MI	**β**	**t (90)**	**Cumulative R^2**	**Cumulative adj. R^2**	**Incremental adj. R^2 (%)**
6-month predictors:					
Block 1			0.109	0.098	
Patients' ethnicity (Caucasians or not)	-0.254	-2.730**			
Block 2			0.192	0.173	7.5**
6-month post-MI symptom perception	-0.102	-0.917			
Block 3			0.298	0.256	8.3**
6-month post-MI consequence component 2: emotional	-0.070	-0.574			
6-month post-MI control component 1: active control	0.219	2.232*			
6-month post-MI future MI threat	-0.088	-0.826			
Block 4			0.344	0.297	4.1*
6-month post-MI perceived special one's support	0.179	1.795			
Block 5			0.358	0.295	-0.2
6-month post-MI depression	0.014	0.096			
6-month post-MI state anxiety	-0.168	-1.073			
F (8, 81) = 5.656, p < 0.001	Subject ID = 31 was excluded due to high Mahalanobis distance (29.030 > 26.13)				

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

During hospitalisation

During hospitalisation, depression was the most significant predictor of the 91 MI patients' positive affect. Besides, ethnicity (Caucasian or not) and income status which were also significant explained positive affect. Those who felt less depressed, those who had income more than £10,001 and those non-Caucasians seemed to have higher positive affect. Illness perceptions did not contribute to their positive affect.

At 4-8 weeks post-MI

Before coping strategies were entered, both ethnicity and income status were significant predictors, and they explained over 12% of the variance. This implied that high-income patients and non-Caucasians seemed to have a higher level of positive affect. After coping was entered in the regression model, income status and positive reframing coping were significant. Finally, even after depression was entered, only positive reframing coping remained significant. Income status and depression became borderline significant ($p = 0.051$ & $p = 0.055$, respectively).

At 6-month post-MI

When ethnicity and symptom perception were considered (at step one and step two), both were significant. After other illness perceptions were considered in the regression, ethnicity and active control perception significantly explained positive affect. Although none of the other illness perceptions was significant, symptom perception added 7.5% of the variance and in total, illness perceptions added an extra 15.8% of the variance.

When social support was added, ethnicity, active control perception and 'perceived support from a special one' became the only significant variables. Finally, when other mood variables were also entered into the regression, only ethnicity and active control perception remained significant. Those non-Caucasian patients and those who believed they could control their MI tended to have a higher level of positive affect.

In summary, the MI patients' positive affect closely correlated with their ethnicity. Non-Caucasians seemed to have higher positive affect than Caucasians. In addition, different variables at different times also had different contributions. Soon after the MI event, mood (depression) was more conspicuous; after returning to home for convalescence, positive reframing coping was more important to explain positive affect. After six months, when normally MI patients had got used to their illness, their feeling of

being able to control their illness seemed to be more important in explaining their positive affect.

9.8.1.4. Negative affect

Table 9.30 illustrates the regression results of the MI patients' negative affect at each assessment.

Table 9. 30. The regression results of the MI patients' negative affect at each assessment

In-hospital negative affect	β	t (85)	Cumulative R^2	Cumulative adj. R^2	Incremental (%)	adj. R^2
In-hospital predictors:						
Block 1			0.212	0.203		
Time 1 patients' symptom perception	0.174	1.793				
Block 2			0.338	0.314	11.1***	
In-hospital consequence component 1: physical	0.074	0.760				
In-hospital consequence component 2: emotional	0.178	1.819				
Block 3			0.458	0.431	11.7***	
In-hospital state anxiety	0.429	4.203***				
F (4, 80) = 16.897, p < 0.001						
Negative affect at 4-8 weeks post-MI	**β**	**t (88)**	**Cumulative R^2**	**Cumulative adj. R^2**	**Incremental (%)**	**adj. R^2**
4-8 weeks predictors:						
Block 1			0.209	0.200		
4-8 weeks post-MI symptom perception	0.062	0.731				
Block 2			0.396	0.367	16.7***	
4-8 weeks post-MI causal component 1:	0.102	1.161				
4-8 weeks post-MI consequence component 1: physical	0.167	1.624				
4-8 weeks post-MI consequence component 2: emotional	0.078	0.717				
Block 3			0.528	0.474	10.7***	
4-8 weeks post-MI denial coping	0.214	2.683**				
4-8 weeks post-MI behaviour disengagement	0.128	1.707				
4-8 weeks post-MI venting	0.064	0.805				
4-8 weeks post-MI self-blame	-0.057	-0.698				
4-8 weeks post-MI planning	-0.012	-0.169				
Block 4			0.671	0.629	15.5***	
4-8 weeks post-MI state anxiety	0.470	5.787***				
F (10, 77) = 15.721, p < 0.001	Subject ID = 33, 9, 110 were excluded one by one at each run due to high standard residual score (3.08, 3.286, 3.169, respectively). In total this regression was run four times until no outlier was detected.					
Negative affect at 6-month post-MI	**β**	**t (90)**	**Cumulative R^2**	**Cumulative adj. R^2**	**Incremental (%)**	**adj. R^2**
6-month predictors:						
Block 1			0.160	0.151		
6-month post-MI symptom perception	0.174	1.752				
Block 2			0.250	0.215	6.4*	
6-month post-MI causal component 1: stress	0.106	1.213				
6-month post-MI consequence component 1: physical	-0.145	-1.247				
6-month post-MI consequence component 2: emotional	0.005	0.040				
Block 3			0.457	0.388	17.3***	
6-month post-MI denial coping	0.044	0.474				
6-month post-MI behaviour disengagement	0.142	1.610				
6-month post-MI venting	0.092	0.878				
6-month post-MI self-blame	0.089	0.996				
6-month post-MI religion coping	0.115	1.235				
6-month post-MI planning	0.131	1.604				
Block 4			0.557	0.495	10.7***	
6-month post-MI state anxiety	0.417	4.204***				
F (11, 77) = 8.924, p < 0.001	Subject ID = 97 (with high standardised residual = 3.091) was deleted					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

During hospitalisation

When symptom perception entered into the regression, it alone explained 20.3% of the variance. Emotional consequence perception component was also significant before sate anxiety was considered. In total, illness perceptions explained 31.4% of the variance. However, state anxiety was the only significant predictor after all predictors were considered.

At 4-8 weeks post-MI

At the first step, when only symptom perception was entered, 20% of the variance was accounted for. After the other illness perception components were also considered, symptom perception was no longer significant, but the emotional consequence perception became significant. In total, illness perceptions explained 36.7% of the variance. When coping strategies were also considered, none of the illness perception components was significant. Only denial and behaviour disengagement coping strategies were significant. Once state anxiety was considered, only state anxiety and denial coping were significant.

At 6-month post-MI

Although none of the illness perception components was significant at the final step, symptom perception and stress causal attribution were significant before coping strategies and state anxiety were entered. When coping strategies were entered after illness perception components, only symptom perception and behaviour disengagement coping were significant. When state anxiety was entered, it became the only significant predictor.

Although it seemed that none of the illness perception components contributed significantly to negative affect over the first six months post-MI, this might not be true. As the previous sections had demonstrated high correlations between negative affect, state anxiety, consequences components and symptom perception, this implied these variables shared a lot of common variances. Therefore, when they were all considered together, each individual variable's comparative contribution to negative affect might decrease to even non-significant. The above table clearly showed that illness perception components were able to explain at least 21% to 36% of the variance across time.

However, when it came to individual variable, mood variables – in this case, state anxiety, was still much more important than other variables.

9.8.2. Multivariate analyses in predicting patients' moods at 6 months post-MI

This section presents the prediction results by using in-hospital variables to predict the MI patients' moods at 6 months post-MI. As explained previously, in order to explore the role of the same type of moods which was measured during patients' hospitalisation, the same type of mood during hospitalisation was either entered at the end of the regression or controlled before other variables were entered into the regression.

9.8.2.1. Depression at 6 months post-MI

Table 9.31 illustrated the regression of the MI patients' depression at 6 months post-MI.

Table 9. 31. The regression result in predicting the MI patients' depression after six months

Depression at 6-month post-MI	β	t (90)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital depression at the end –					
Block 1			0.144	0.134	
In-hospital symptom perception	0.014	0.139			
Block 2			0.234	0.198	6.4*
In-hospital consequence component 1: physical	0.056	0.559			
In-hospital consequence component 2: emotional	-0.041	-0.408			
In-hospital future MI threat	0.045	0.493			
Block 3			0.440	0.393	19.5***
In-hospital depression	0.243	1.824			
In-hospital state anxiety	0.377	2.907**			
In-hospital positive affect	-0.126	-1.310			
F (7, 82) = 9.220, p < 0.001	Subject ID = 50 was excluded due to a high Mahalanobis distance (26.07 > 24.32)				
Depression at 6-month post-MI	β	t (90)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital depression at first –					
Block 1			0.344	0.336	
In-hospital depression	0.243	1.824			
Block 2			0.352	0.337	0.1
In-hospital symptom perception	0.014	0.139			
Block 3			0.374	0.337	0.0
In-hospital consequence component 1: physical	0.056	0.559			
In-hospital consequence component 2: emotional	-0.041	-0.408			
In-hospital future MI threat	0.045	0.493			
Block 4			0.440	0.393	5.6**
In-hospital state anxiety	0.377	2.907**			
In-hospital positive affect	-0.126	-1.310			
F (7, 82) = 9.220, p < 0.001	Subject ID = 50 was excluded due to a high Mahalanobis distance (26.07 > 24.32)				

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 9.31 indicated that no matter whether the in-hospital depression was controlled for at first or not, in-hospital anxiety was the only significant predictor of 6-month depression.

When examining the regression model step by step, other important information emerged. If in-hospital depression was not controlled for before illness perceptions, the MI patients' symptom perception and 'fear of future MI' were significant and illness perception components explained almost 20% of the variance. When the baseline mood variables (in-hospital depression, anxiety and positive affect) were added last, state anxiety became the only significant predictor. However, when in-hospital depression was controlled for at the first block, none of the illness perception components were significant at step two and three. Clearly, the contribution of in-hospital depression was greater than that of in-hospital illness perceptions, even though it was not as significant as in-hospital state anxiety.

The finding that in-hospital depression remained significant until anxiety was entered further supported the idea that in-hospital anxiety was more important than in-hospital depression for predicting depression at 6-month post-MI.

9.8.2.2. Anxiety at 6 months post-MI

Table 9.32 displays the predicting results of 6-month post-MI state anxiety.

Table 9. 32. The regression result in predicting the MI patients' anxiety after six months

state anxiety at 6-month post-MI	β	t (90)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital state anxiety at the end –					
Block 1			0.079	0.069	
Patients' age	-0.240	-2.936**			
Block 2			0.326	0.278	20.9***
In-hospital causal component 2: external/uncontrollable	-0.247	-3.038**			
In-hospital consequence component 1: physical	0.064	0.658			
In-hospital consequence component 2: emotional	0.038	0.387			
In-hospital timeline	-0.121	-1.148			
In-hospital future MI threat	0.217	2.152*			
Block 3			0.507	0.452	17.4***
In-hospital state anxiety	0.240	2.124*			
In-hospital depression	0.191	1.616			
In-hospital positive affect	-0.210	-2.275*			
F (9, 81) = 9.240, p < 0.001					
State anxiety at 6-month post-MI	β	t (90)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital state anxiety at first –					
Block 1			0.248	0.240	
In-hospital state anxiety	0.240	2.124*			
Block 2			0.326	0.310	7.0**
Patients' age	-0.240	-2.936**			
Block 3			0.422	0.373	6.3*
In-hospital causal component 2: external/uncontrollable	-0.247	-3.038**			
In-hospital consequence component 1: physical	0.064	0.658			
In-hospital consequence component 2: emotional	0.038	0.387			
In-hospital timeline	-0.121	-1.148			
In-hospital future MI threat	0.217	2.152*			
Block 4			0.507	0.452	7.9**
In-hospital depression	0.191	1.616			
In-hospital positive affect	-0.210	-2.275*			
F (9, 81) = 9.240, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

When in-hospital anxiety was entered at the end of the regression and age was entered at the first, age remained significant through the three regression steps. When illness perception components were also considered, uncontrollable causal component and fear of another MI were also significant. Finally, when in-hospital moods were entered, age, uncontrollable causal component, fear of another MI, in-hospital anxiety and positive affect became significant predictors.

If in-hospital anxiety was first controlled for, it remained significant through the four regression steps. When age was entered at step two, age also remained significant until the final step. Uncontrollable causal component was the only significant illness perception component at step three. However, after in-hospital depression and positive

affect were entered, fear of another MI and in-hospital positive affect became significant along with in-hospital anxiety, age, and uncontrollable causal component.

Therefore, whether in-hospital anxiety was controlled for first or entered at the end of the regression, the results were the same - Those who believed their MI was caused by uncontrollable causes, those who feared of another MI, those with younger age, and those with high level of anxiety or low level of positive affect were more anxious after six months.

9.8.2.3. Positive affect at 6 months post-MI

Table 9.33 presents the regression model of the MI patients' positive affect after six months. Although only two predictors were entered, both were significant.

Table 9. 33. The regression result in predicting the MI patients' positive affect after six months

Positive affect at 6-month post-MI	β	t (89)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital positive affect at the end –					
Block 1			0.144	0.134	
Patients' ethnicity (Caucasians or not)	-0.209	-2.177*			
Block 2			0.320	0.304	17.0***
In-hospital positive affect	0.453	4.727***			
F (2, 86) = 20.258, p < 0.001	Subject ID = 107 & 32 were excluded due to a high standard residual score (3.341 & 3.027, respectively)				
Positive affect at 6-month post-MI	β	t (89)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital positive affect at first –					
Block 1			0.283	0.275	
In-hospital positive affect	0.453	4.727***			
Block 2			0.320	0.304	2.9*
Patients' ethnicity (Caucasians or not)	-0.209	-2.177*			
F (2, 86) = 20.258, p < 0.001	Subject ID = 107 & 32 were excluded due to a high standard residual score (3.341 & 3.027, respectively)				

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Regardless of whether the in-hospital positive affect was controlled for at first or not, its contribution was more significant than whether the patients were Caucasians or not. Those had a higher level of in-hospital positive affect and those were non-Caucasian seemed to have more positive affect after 6-month post-MI.

9.8.2.4. Negative affect at 6 months post-MI

Table 9.34 illustrates the regression results of predicting the MI patients' negative affect after six months. The result was very similar to what was found in predicting depression at the same time. Regardless of whether the in-hospital negative affect was controlled for first or at the end, the in-hospital state anxiety was the only significant predictor. Those who felt more anxious during hospitalisation were more likely to have a higher level of negative affect after six months.

Table 9. 34. The regression result in predicting the MI patients' negative affect after six months

Negative affect at 6-month post-MI	β	t (83)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital depression at the end –					
Block 1			0.050	0.038	
In-hospital patients' symptom perception	-0.081	-0.704			
Block 2			0.050	0.026	-1.2
In-hospital control component 1: active control	0.049	0.496			
Block 3			0.272	0.235	20.9***
In-hospital negative affect	0.105	0.809			
In-hospital state anxiety	0.491	3.498***			
F (4, 78) = 7.285, p < 0.001	Subject ID = 50 & 73 were excluded due to high Mahalanobis distances (19.23 & 68.77, respectively, both > 18.47)				
Negative affect at 6-month post-MI	β	t (83)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Using in-hospital depression at first –					
Block 1			0.153	0.142	
In-hospital negative affect	0.105	0.809			
Block 2			0.157	0.136	-0.6
In-hospital symptom perception	-0.081	-0.704			
Block 3			0.158	0.126	-1.0
In-hospital control component 1: active control	0.049	0.496			
Block 4			0.272	0.235	10.9***
In-hospital state anxiety	0.491	3.498***			
F (4, 78) = 7.285, p < 0.001	Subject ID = 50 & 73 were excluded due to high Mahalanobis distances (19.23 & 68.77, respectively, both > 18.47)				

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Although the result was not influenced by whether the in-hospital negative affect was controlled for at first or not, it influenced the comparative contribution of the other in-hospital variables. When not controlling for the in-hospital negative affect first, the patients' symptom perception was significant when it was entered at the first step or with other illness perception components. However, its significant contribution disappeared after other in-hospital moods were entered into the regression. At the end, the in-hospital anxiety was the only significant predictor.

If the in-hospital negative affect was controlled for first, none of the illness perception components remained significant. The in-hospital negative affect remained significant until in-hospital anxiety was also considered. Finally, the in-hospital anxiety still was the sole significant predictor.

9.8.3. Other hypotheses testing

As some hypotheses have been tested in the previous sections, this section presents a number of the hypothesis testing that is related to the MI patients.

H8: Patients' illness consequence perception will contribute more to moods than social support and coping.

The patients' physical consequence perception and/or emotional consequence perception were both entered into the regression models at the second and at the third assessment to explain depression, state anxiety and negative affect for the two follow-ups and at the third assessment for positive affect. Social support or coping strategies were used for depression, positive affect, negative affect at both second and third assessment, and for state anxiety at the third assessment. The regression results indicated that none of the patients' physical consequence or emotional consequence perception was an important predictor when coping or social support was also entered into the regression models. Therefore, hypothesis eight could not be supported.

The regression results also revealed that substance abuse coping contributed significantly to depression at the second assessment and self-blame coping contributed to depression at the third assessment. Denial coping significantly contributed to negative affect at the second assessment. This implied that substance abuse, self-blame and denial were more important than illness consequence perceptions at 4-8 weeks post-MI. In the Common Sense Model of Illness (CSMI), illness perceptions lead to coping and then to coping results. In these cases, it could be that these coping strategies had stronger direct influences on depression or negative affect.

H9: At 4-8 week and 6-month post-MI, patients' social support will significantly increase the prediction of the variance of moods.

At the second assessment, none of the patients' perceived support (total support, special one's support, family support, and friends' support) was qualified to enter into

the regression model, as their correlations with the patients' post-MI moods were not significant. At the third assessment, the patients' perceived total support was entered into the regression models to explain state anxiety, and their perceived special one's support was entered into regression models to explain positive affect. However, neither of these two variables showed any significant contribution. In conclusion, hypothesis nine was not supported.

H10: Patients' desired support and the difference between perceived and desired support will predict their depression at 4-8 week and 6-month post-MI.
Both of the patients' desired support and difference between perceived and desired support had very low correlation coefficients with their depression scores at the second and third assessment. Therefore, they were not entered into the regression and hypothesis ten was not supported.

H12: The adding of coping strategies to illness perceptions will significantly increase the explanation of variance of post-MI patients' moods.
At the second assessment, coping strategies increased the variance of the MI patients' depression, positive affect and negative affect for 14.4% ($p < 0.001$), 11.1% ($p < 0.001$), and 10.7% ($p < 0.001$), respectively. However, none of the coping strategies was able to predict the patients' state anxiety. Although coping strategies were not selected to explain the patients' positive affect at time 3, they increased the variance of patients' depression, state anxiety, and negative affect for 16% ($p < 0.001$), 5.0% ($p < 0.05$) and 17.3% ($p < 0.001$), respectively. Therefore, when coping strategies were entered into the regression models, they significantly increased the variance explained in patients' moods. In conclusion, hypothesis twelve was supported.

9.9. Conclusion

This chapter describes the MI patients' responses in terms of moods, illness perceptions, social support and coping strategies over the first six months post-MI. During the first six months, the MI patients' depression and negative affect decreased and positive affect increased significantly. Although in-hospital illness perceptions made a strong contribution to the patients' negative moods at six months post-MI, their impacts were not as important as that of the other baseline mood variables.

CHAPTER TEN – GOING THROUGH IT TOGETHER I: FIRST-TIME MI COUPLES' RESPOSNES DURING PATIENTS' HOSPITALISATION

This chapter focuses on the 42 first-time MI couples' emotional and cognitive responses moods during patients' hospitalisation.

10.1. Characteristic information of the MI couples

10.1.1. Demographic information

Table 10.1 presents 42 MI couples' demographic data. Neither age ($t = 1.206$, $p = 0.231$) nor years of education was significantly different between couples ($t = -1.95$, $p = 0.054$).

Table 10. 1. The 42 first-time MI couples' demographic data

	Patient			Spouse		
Gender	Total (=42)	Male (= 36)	Female (= 6)	Total (= 42)	Male (= 6)	Female (= 36)
Ethnicity	Caucasian: 31 (73.8%) Others: 11 (26.2%)	25 (59.5%) 11 (26.2%)	6 (14.3%)	Caucasian: 33 (78.6%) Others: 9 (21.4%)	6 (14.3%)	27 (64.3%) 9 (21.4%)
Age (year)	61.12 (12.13)	60.03 (12.22)	67.67 (10.13)	57.81 (13.01)	70.00 (9.25)	55.78 (12.50)
Education (year)	10.70 (2.45)	10.82 (2.59)	10.00 (1.27)	11.86 (2.94)	12.00 (3.22)	11.83 (2.94)
Living with others or not	Partners only: 28 (66.7%) Family: 14 (33.3%)	22 (52.4%) 14 (33.3%)	6 (14.3%)			

10.1.2. Medical information

Table 10.2 reveals the 42 MI patients' co-morbidity. No significant difference was found between genders.

Table 10. 2. Medical information of the 42 married MI patients

Patient Participant (N = 42)	Yes	No	χ^2 (Gender)
Family CHD	Male = 21; Female = 2; Total = 23 (54.8%)	Male = 15; Female = 4; Total = 19 (45.2%)	$\chi^2_{(1)} = 1.297$ (p = 0.255)
Diabetes	Male = 9; Female = 3; Total = 12 (28.6%)	Male = 27; Female = 3; Total = 30 (71.4%)	$\chi^2_{(1)} = 1.575$ (p = 0.209)
Hypertension	Male = 8; Female = 1; Total = 9 (21.4%)	Male = 28; Female = 5; Total = 33 (78.6%)	$\chi^2_{(1)} = 0.094$ (p = 0.759)
Thrombolysis	Male = 19; Female = 5; Total = 24 (57.1%)	Male = 16; Female = 1; Total = 17 (40.5%)	$\chi^2_{(2)} = 1.987$ (p = 0.370)

In terms of the 42 patients' MI site, ten (23.8%) had anterior MI (9 males & 1 female). Fifteen (35.7%) had inferior MI (11 males & 4 females) and 17 (40.5%) had other types of MI (16 males & 1 female). Chi-squares showed no significant difference ($\chi^2_{(2)} = 3.008$, p = 0.222).

Finally, the mean time between hospital admission and the first assessment was 5.60 days (SD = 3.23, range: 3 – 17 days). In addition, at the time of the MI onset, 21 (50%) patients were smokers (18 males and 3 females), 17 (40.5%) were ex-smokers (14 males and 3 females) and four males (9.5%) had never smoked. For the spouses, 13 were smokers, 26 were non-smokers and three were ex-smokers. The percentage of smokers vs. non-smokers (including ex-smokers) was not significant between couples ($\chi^2_{(1)} = 3.162$, p = 0.075).

In the following sections, the couples' moods and illness perceptions are examined and the attention centres on the following questions:

- Did couples have similar responses on moods or illness perceptions?
- Were there reciprocal relationships between couples' mood and/or illness perceptions?
- Would couples' differences on illness perceptions distinguish their moods?
- Would couples' moods and illness perceptions contribute to each other's own moods?

Independent t-tests were used to examine the couples' moods and emotional consequence perception component from the IPQ questionnaire. Paired t-tests were used to investigate the couples' other illness perception components. The reason for using independent t-tests on moods was based on the belief that an MI event would not be the only factor to influence couples' individual moods. In addition, these couples were asked to report their own feelings instead of what they thought about the patients' feelings. Therefore, these 42 patients and their spouses should be examined

independently. However, the 42 spouses were asked to report their opinions of the patients' perceptions on other remaining illness perception components, so paired t-tests should be used on these comparisons.

10.2. What are first-time MI couples' emotional responses and illness perceptions during patients' hospitalisation?

10.2.1. First-time MI couples' moods

Table 10.3 displays the 42 MI couples' moods when the patients were still in hospital.

Table 10. 3. Comparisons of the 42 first-time MI couples' moods

Couples' moods during patients' hospitalisation	Patient Mean (SD)	Spouse Mean (SD)	Mean difference (99% CI)	t	p
Depression	14.76 (9.03)	24.40 (12.72)	9.64 (3.28 – 16.01)	4.007**	< 0.001
State anxiety	33.25 (11.32)	48.57 (17.22)	15.32 (6.90 – 23.74)	4.817**	< 0.001
Positive affect	27.60 (7.40)	29.33 (7.53)	1.73 (-2.56 – 6.03)	1.067	0.289
Negative affect	19.64 (9.01)	27.86 (8.31)	8.22 (3.23 – 13.20)	4.343**	< 0.001

CI: confidence interval

The spouses reported higher scores than the patients did on all the three negative moods. Although these spouses also reflected a higher level of positive affect than the patients did, it was not significant. This implied that when the patients were in hospital, their spouses were more depressed and anxious, and had a stronger negative affect.

Seventeen (40.48%) patients and 29 (69.05%) spouses scored higher than 16 on CESD depression scale. Among the 17 patients, 13 were males (36.11%) and four were females (66.66%). Among the 29 spouses, four were males (66.66%) and 25 were females (69.44%). In addition, of the 17 depressed patients, 14 (82.35%) of their spouses (four husbands and ten wives) were also depressed.

Using score = 50 as the cut-off point for state anxiety, it was found that 17 (40.5%) spouses and 6 (14.3%) patients scored higher than 50. Of these six patients, only one of their spouses also scored higher than 50. Overall, only six patients scored high on both depression and state anxiety, but 17 spouses reported high scores on both moods.

As past studies have shown females tended to have higher scores on depression and anxiety (An et al., 2004; Bogg et al., 2000), it was important to examine whether the significant differences between the MI couples were due to gender or patient/spouse role. To examine this, the following steps were conducted:

Step 1. Because of the large ratio of males/females in couples, it was decided to combine couples together (in total 84 subjects), and then independent t-tests were conducted on depression, state anxiety and negative affect between genders. The results showed females had higher scores on all three negative moods than males (but females also had higher standard deviations on all three negative moods). Therefore, this stage revealed a significant difference between genders on three negative moods.

Step 2. Simple ANOVAs ('group' was treated as a between-subject variable) were conducted on depression, state anxiety and negative affect. Group effects were significant. Therefore, the results echoed the previous results from independent t-tests.

Step 3. 'Gender' was controlled as a covariate and all three ANOVAs were re-run. This time only negative affect still had a significant group effect ($F_{(1, 81)} = 7.079$, $p = 0.009$). None of the state anxiety and depression had a significant group effect (Appendix D-1).

Another way was to conduct a 2 x 2 ANOVA (role x gender, 'role' represents patients vs. spouses, 'gender' represents males vs. females). The full results were attached at Appendix D-3, with Appendix D-2 presenting mean scores of each mood between genders within patient and within spouse group. It also showed that only 'negative affect' had a significant role effect ($F_{(1, 80)} = 7.079$, $p = 0.009$).

Therefore, the results from both methods indicated that although in the current study, the MI spouses reported higher levels of depression and state anxiety, it was probably due to the fact that the majority of the spouses happened to be females. However, the higher level of negative affect reported by the spouses reflected that these spouses, no matter they were males or females, had a higher level of negative affect than the patients.

The above findings did not support all of the comparison results (Table 10.3), which showed the 42 spouses significantly reported higher scores on all three negative moods. Instead, the findings on the couples' depression and anxiety supported past studies that

females tended to be more depressed or anxious when facing stressful events (An et al., 2004; Bogg et al., 2000).

The inconsistent findings might result from several factors: (1) small sample size; (2) the ratio of males vs. females was too big (1:6); (3) non-equal variances on depression and state anxiety; and (4) females had a much bigger S.D. on depression and state anxiety score.

Therefore, one should only make a conservative conclusion - the difference in negative affect might be caused by the couples' roles (patient vs. spouse), but the difference in depression and state anxiety might be caused by genders, not roles.

Hypothesis testing

H15: MI patients will have higher levels of depression and anxiety than their spouses do. Although the above comparisons showed spouses' depression, state anxiety and negative affect were significantly higher than that of the MI patients', after controlling for gender effect, it was found that only negative affect remained different between couples. Therefore, MI patients had similar levels of depression and state anxiety to their spouses before hospital discharge.

10.2.2. First-time MI couples' illness perceptions

10.2.2.1. Couples' causal attributions

Couples' causal attributions were compared in two ways. The first compared each individual item, as each item represented a specific causal belief. Overall, *'stress'*, *'smoking'*, *'high cholesterol'*, *'bad luck/chance'* and *'eating fatty food'* were the top five main causes for the patients and *'stress'*, *'lack of exercise'*, *'bad luck/chance'*, *'type of work'* and *'high cholesterol'* were the top five main causes for the spouses. Paired t-tests indicated the couples only significantly differed on *'lack of exercise'* (mean difference = 0.667, t = 2.776, p = 0.008), as on average the spouses had a stronger belief in this cause (Appendix D-4).

The second approach compared three causal components (stress, uncontrollable or external causes, unhealthy lifestyles or behaviours), which was based on the principal component analyses of the 119 MI patients' in-hospital responses on the IPQ (Weinman et al., 1996). None of the causal components showed a significant difference between the MI couples (Appendix D-4).

10.2.2.2. Couples' symptom perceptions

Symptom perception was also examined in two ways. The first approach examined individual item and the second approach examined total symptom score. As two coding systems were used to calculate patients' symptom scores, the same coding systems were used in couples. The first system coded 'all the time = 3', 'frequently = 2', 'occasionally = 1', and 'never = 0'. The second system coded the answers of either 'all the time', 'frequently', or 'occasionally' as '1' and 'never' as '0' in order to compare with previous studies (Weinman et al., 1996; 2000).

Multiple response coding method (MR)

'Fatigue/lack of energy', *'breathlessness'*, *'loss of strength'*, *'sleep difficulties'*, and *'dry mouth'* were the top five symptoms (or observed symptoms) from the patients and their spouses. Except for *'sleep difficulties'* (patients vs. spouses = 0.55 ± 0.94 vs.1.07 ± 1.22, t = -3.001, p = 0.005), paired t-tests showed the couples' symptom perception score on each item was not significantly different, although the spouses generally seemed to observe more symptoms than that of the patients' reports (Appendix D-5). The total symptom perception scores were also similar between the 42 couples.

Dichotomous coding method

Paired t-tests showed no significant difference between the couples when using a dichotomous coding system (Appendix D-6) on individual symptom or total symptom scores.

Although the total symptom scores which were calculated by these two coding systems were highly correlated (r = 0.962 for patients and 0.933 for spouses), the multiple response coding method was chosen to calculate total the symptom score.

10.2.2.3. Couples' illness perceptions of timeline, consequences, cure/control and future MI threat

Timeline, two consequence perceptions (physical & emotional consequences) and two control perceptions (active-control and passive control) were compared between the couples. One single item measuring 'future MI threat' was used to compare the couples. Results showed no significant difference between the 42 couples (Appendix D-7).

10.3. Will first-time MI couples influence each other's moods and illness perceptions?

10.3.1. Correlations between MI couples' moods

Table 10.4 presents the correlations of 42 MI couples' moods (Appendix D-8 to D-10). None of their moods significantly correlated with each other's. Although three correlation coefficients did not reach statistical significance (the patients' *positive affect* with their spouses' *depression* and *negative affect;* and the spouses' *positive affect* with the patients' *negative affect*), they still deserved attention. These correlations seemed to indicate these couples might try to hide their negative feelings from each other or they tried to 'wear a happy mask' to cheer up each other.

Table 10. 4. Correlations between the 42 first-time MI couples' moods

Spouses' moods during patients' hospitalisation		Patients' in-hospital moods			
		Depression	State anxiety	Positive affect	Negative affect
	Depression	**0.008**	-0.125	0.346	0.052
	State anxiety	0.135	**-0.162**	0.182	0.017
	Positive affect	0.050	0.074	**0.210**	0.307
	Negative affect	-0.051	-0.237	0.302	**0.059**

Hypothesis testing

H16: MI couples' moods, in particular depression and anxiety will positively correlate.
As none of the couples' moods showed significant correlations, this hypothesis was not supported.

Further correlations of couples' moods

It was also found (Appendix D-9, Appendix D-10) that the more education the patients had or the longer the patients stayed in the hospital, the more they felt depressed. The older the patients, the less negative affect their spouses reported. In addition, the older the spouses, the stronger positive affect the patients reported. Furthermore, older spouses tended to feel less depressed or reported less negative affect. Finally, as with MI patients, spouses' negative moods strongly correlated together.

10.3.2. Correlations between MI couples' illness perceptions

Table 10.5 displays the significant correlations of couples' illness perceptions (Appendix D-11 to D-14).

Table 10. 5. Significant correlations between the 42 first-time MI couples' illness perceptions

Spouses' illness perceptions	Patients' in-hospital illness perceptions					
	Causal component 1: Stress	Causal component 2: uncontrollable (external)	Causal component 3: Unhealthy lifestyles	Consequence component 1: Physical consequences	Control component 1: Active control	Symptom perception
Causal component 1: Stress	0.465**					
Causal component 2: Uncontrollable(external)		0.410**				
Causal component 3: Unhealthy lifestyles			0.522***			
Consequence component 1: Physical consequences				0.414**		
Consequence component 2: Emotional consequences	0.468**			0.417**		
Control component 1: Active control					0.451**	
Control component 2: Passive control		0.479***				
Symptom perception						0.602***

** $p \leq 0.01$; *** $p \leq 0.001$

The MI patients' three causal attribution components were significantly (positively) correlated with the same component of their spouses'. This indicated these couples had similar opinions about what might have caused the patient's MI. Secondly, the couples' physical consequence perceptions were positively correlated. Their perceptions of active control were correlated and so did their symptom perceptions. Therefore, it suggested the MI couples' had similar beliefs in these perceptions.

In addition, it was also found that (a) the stronger the patients believed in stress causes, the stronger their spouses believed the MI event would bring themselves (the spouses) serious emotional consequences; (b) the stronger the patients believed in uncontrollable causes, the less possible their spouses believed that MI could be controlled; (c) the stronger the patients felt their illness would bring serious physical consequences, the more their spouses thought the illness would bring themselves serious emotional consequences.

Further correlations of couples' illness perceptions

The patients' age was negatively correlated with their partners' beliefs in stress causes, physical consequences and the partners' own emotional consequence perceptions. The older the patients, the less beliefs their spouses had in the above three illness perceptions. Those patients who stayed in the hospital longer tended not to believe they could do something to improve their illness. Also, the more education the partners had, the worse emotional consequences the patients expected. Finally, the older the spouses, the less they believed patients' MI was caused by stress or unhealthy lifestyles, and the spouses also had less belief that the MI event would bring the patients worse physical consequences and themselves worse emotional consequences (Appendix D-12).

Although the correlation patterns of the couples' own illness perceptions were different, both couples tended to show there was a positive correlation between stress and unhealthy lifestyle causes. The stronger they believed in worse physical consequences, the, worse emotional consequences they expected to face.

Those patients who believed that unhealthy lifestyles caused the MI also tended to believe they could improve the situation. MI patients who believed it was going to take a long time to recover also had a greater fear of future MI.

Further important correlations between the spouses' illness perceptions included that (a): the stronger they believed that stress caused the MI, the worse consequences they expected. (b): those spouses who believed in uncontrollable causes tended to believe in quick recovery and acknowledged nothing can be done. (c): those spouses who observed more symptoms tended to expect worse consequences and a longer recovery time (Appendix D-13, D-14)

Section 10.3 showed that the MI couples did not significantly influence each other's moods. However, the couples seemed to agree on the same types of illness perception components. Although there were different correlation patterns between couples' own illness perceptions, both believed that stress and unhealthy lifestyle causes were linked and the worse physical consequences they expected, the worse emotional consequences they believed.

10.4. Will first-time MI couples' illness perceptions correlate with their moods?

Table 10.6 lists significant correlations between the MI couples' illness perceptions and the patients' moods (Appendix D-15) and Table 10.7 shows the couples' illness perceptions with the partners' moods (Appendix D-16).

Table 10. 6. Significant correlations between the 42 MI patients' moods and the 42 MI couples' illness perceptions during patients' hospitalisation

	Patients' in-hospital moods		
	Depression	State anxiety	Negative affect
Patients' in-hospital illness perceptions -			
Consequence component 1: Physical consequences	0.557***		0.558***
Consequence component 2: Emotional consequences	0.401**	0.413**	0.512***
Timeline		0.446**	
Symptom perception	0.627***	0.550***	0.527***
Spouses' illness perceptions during patients' hospitalisation -			
Symptom perception	0.545***		

** $p \leq 0.01$; *** $p \leq 0.001$

Table 10. 7. Significant correlations between the 42 spouses' moods and the 42 MI couples' illness perceptions

	42 spouses' moods during patients' hospitalisation			
	Depression	State anxiety	Positive affect	Negative affect
Spouses' illness perceptions during patients' hospitalisation -				
Causal component 1: stress	0.468**	0.453**		0.449**
Causal component 2: uncontrollable			-0.401**	
Consequence component 1: Physical consequences	0.569***			0.392**
Consequence component 2: Emotional consequences	0.771***	0.582***		0.716***

** $p \leq 0.01$; *** $p \leq 0.001$

In general, the patients' moods did not significantly correlate with their spouses' illness perceptions (except for the spouses' symptom perception with the patients' depression), nor did the spouses' moods significantly correlate with the patients' illness perceptions. Both couples' perceptions on physical and emotional consequences positively correlated with their own negative moods, i.e. depression, state anxiety and negative affect.

None of the patients' causal attributions correlated with their moods. However, the more symptoms they had, the stronger negative moods they reported. The belief of a long recovery time showed a positive correlation with the patients' anxiety.

MI spouses' attribution on stress was positively correlated with their own negative moods. The stronger the spouses believed that stress caused the MI, the more depressed, anxious and negative they were. In addition, those spouses who believed that the MI was uncontrollable also tended to had less positive affect.

In summary, the patients' moods mainly correlated significantly with their own illness perceptions but not that of their spouses'. The spouses' moods also mainly correlated with the spouses' own illness perceptions (Table 10.8).

Table 10. 8. Summary of significant correlations between the 42 first-time MI couples' moods and illness perceptions

	Patients' in-hospital moods				Spouses' moods during patients' hospitalisation			
	depression	anxiety	(+) affect	(-) affect	depression	anxiety	(+) affect	(-) affect
Patients' in-hospital illness perceptions								
Consequence component 1: Physical consequences	+			+				
Consequence component 2: Emotional consequences	+	+		+				
Timeline		+						
Symptom perception	+	+		+				
Spouses' illness perceptions during patients' hospitalisation								
Causal component 1: Stress causes					+	+		+
Causal component 2: Uncontrollable causes							-	
Consequence component 1: Physical consequences					+			+
Consequence component 2: Emotional consequences					+	+		+
Symptom perception	+							
Future MI threat								

10.5. Will the similarity of first-time MI couples' illness perceptions influence their moods?

To understand whether the couples' similarity in illness perceptions distinguished their moods, this section used three approaches to explore this.

The first approach was using one-way ANOVAs to compare the couples. Following the method used by Figueiras & Weinman (2003), MI couples were divided into four groups:
(patient's score is higher than the median score, spouse's score is higher than the median score),
(patient's score is higher than the median score, spouse's score is lower than the median score),
(patient's score is lower than the median score, spouse's score is higher than the median score),
(patient's score is lower than the median score, spouse's score is lower than the median score).

However, considering there were only 42 couples and sometimes one group contained just few participants, the four-group method was collapsed into three groups:
G2 - both couples scored higher than the median score,
G1 - couples with different opinions,
G0 - both couples scored lower than the median score. '

The third way was to use the patients' mood score minus the spouses' mood score, then divided the couples' into three groups (*couples' difference > 0*, *couples' difference = 0*, and *couples' difference < 0*). As the results of the first approach and the second approach were quite similar, Table 10.9 only presents the results from the second approach. Significant results from the third approach were in Appendix D-17.

In Table 10.9, Games-Howell pair wise test, Tamhane's T2, T3 and Dunnett's C were used to examine post hoc comparisons when group sample sizes and variances were unequal. Because 'emotional consequences' component focused on each participant's individual moods, but not the patients', the couples' difference on this component was not calculated.

Table 10. 9. Summary of the 42 first-time MI couples' illness perception differences on moods (three groups)

Couples' similarity in illness perceptions –	42 patients' in-hospital moods in three groups: Mean (SD) Moods	Both disagree	With different opinions	Both agree	F value & post hoc results	Couples' similarity in illness perceptions -	42 spouses' moods in three groups during patients' hospitalisation: Mean (SD)	Both disagree	With different opinions	Both agree	F value & post hoc results
Causal component 1: Stress causes	Depression	13.60 (7.26) (n = 15)	13.83 (8.43) (n = 12)	16.67 (11.14) (n = 15)	$F_{(2, 39)} = 0.509$, p = 0.605	Causal component 1: Stress causes	depression	18.87 (12.49) (n = 15)	21.25 (9.74) (n = 12)	32.47 (11.50) (n = 15)	**$F_{(2, 39)} = 5.969$, p = 0.005 (but no significant post hoc)**
	State anxiety	35.56 (10.05)	26.94 (7.17)	36.00 (13.64)	$F_{(2, 39)} = 2.851$, p = 0.070		State anxiety	39.33 (11.14)	46.11 (16.32)	59.78 (17.43)	**$F_{(2, 39)} = 7.074$, p = 0.002 G2 – G0 = 20.44, p = 0.002**
	Positive affect	27.13 (7.19)	25.75 (7.99)	29.53 (7.17)	$F_{(2, 39)} = 0.912$, p = 0.410		Positive affect	30.40 (7.68)	30.42 (8.43)	27.40 (6.71)	$F_{(2, 39)} = 0.761$, p = 0.474
	Negative affect	20.87 (9.85)	16.33 (7.44)	21.07 (9.16)	$F_{(2, 39)} = 1.144$, p = 0.329		Negative affect	24.13 (8.90)	26.08 (5.00)	33.00 (7.59)	**$F_{(2, 39)} = 5.719$, p = 0.007 (but no significant post hoc)**
Causal component 2: Uncontrollable (External) causes	Depression	18.17 (11.81) (n = 12)	13.64 (6.44) (n = 11)	13.26 (8.16) (n = 19)	$F_{(2, 39)} = 1.213$, p = 0.308	Causal component 2: Uncontrollable (External) causes	depression	20.75 (12.56) ((n = 12)	26.09 (12.15) (n = 11)	25.74 (13.32) (n = 19)	$F_{(2, 39)} = 0.686$, p = 0.510
	State anxiety	37.00 (15.62)	33.64 (8.88)	30.53 (6.98)	$F_{(2, 39)} = 1.315$, p = 0.280		State anxiety	41.11 (15.66)	46.36 (18.29)	54.56 (16.19)	$F_{(2, 39)} = 2.544$, p = 0.092
	Positive affect	26.33 (8.04)	27.09 (6.47)	28.68 (7.72)	$F_{(2, 39)} = 0.394$, p = 0.677		Positive affect	32.08 (6.22)	29.82 (7.51)	27.32 (8.04)	$F_{(2, 39)} = 1.546$, p = 0.226
	Negative affect	23.42 (12.57)	20.64 (6.15)	16.68 (6.91)	$F_{(2, 39)} = 2.280$, p = 0.116		Negative affect	24.08 (7.67)	29.45 (7.84)	29.32 (8.60)	$F_{(2, 39)} = 1.800$, p = 0.179
Causal component 3: Unhealthy lifestyles	Depression	14.21 (9.98) (n = 14)	14.85 (6.64) (n = 13)	15.20 (10.39) (n = 15)	$F_{(2, 39)} = 0.042$, p = 0.959	Causal component 3: Unhealthy lifestyles	Depression	22.29 (13.99) (n = 14)	28.62 (11.04) (n = 13)	22.73 (12.79) (n = 15)	$F_{(2, 39)} = 1.038$, p = 0.364
	State anxiety	35.71 (11.94)	29.23 (8.73)	34.44 (12.45)	$F_{(2, 39)} = 1.249$, p = 0.298		State anxiety	44.52 (18.19)	52.31 (18.18)	49.11 (15.76)	$F_{(2, 39)} = 0.689$, p = 0.508
	Positive affect	28.21 (5.73)	26.62 (7.72)	27.87 (8.81)	$F_{(2, 39)} = 0.166$, p = 0.848		Positive affect	31.00 (5.51)	28.69 (8.32)	28.33 (8.62)	$F_{(2, 39)} = 0.510$, p = 0.604
	Negative affect	18.43 (7.95)	20.15 (6.40)	20.33 (11.90)	$F_{(2, 39)} = 0.185$, p = 0.832		Negative affect	24.14 (8.80)	30.92 (6.17)	28.67 (8.64)	$F_{(2, 39)} = 2.528$, p = 0.093
Consequence component 1: Physical consequences	Depression	10.33 (4.06) (n = 9)	14.68 (10.08) (n = 19)	17.71 (9.12) (n = 14)	$F_{(2, 39)} = 1.914$, p = 0.161	Consequence component 1: Physical consequences	Depression	11.00 (5.41) (n = 9)	22.95 (11.56) (n = 19)	35.00 (7.67) (n = 14)	**$F_{(2, 39)} = 18.504$, p < 0.001 G2 – G0 = 24.00, p < 0.001 G2 – G1 = 12.053, p = 0.003 G1 – G0 = 11.947, p = 0.003**
	State anxiety	28.15 (5.80)	35.09 (12.74)	34.05 (11.63)	$F_{(2, 39)} = 1.211$, p = 0.309		State anxiety	37.04 (13.28)	45.26 (15.49)	60.48 (15.30)	**$F_{(2, 39)} = 7.537$, p = 0.002 G2 – G0 = 23.44, p = 0.003**
	Positive affect	21.78 (4.84)	28.74 (7.00)	29.79 (7.75)	$F_{(2, 39)} = 4.180$, p = 0.023		Positive affect	29.89 (6.17)	29.00 (8.76)	29.43 (6.97)	$F_{(2, 39)} = 0.042$, p = 0.959
	Negative affect	13.44 (1.94)	19.84 (10.54)	23.36 (7.62)	$F_{(2, 39)} = 3.777$, p = 0.032		Negative affect	20.67 (5.61)	27.05 (7.25)	33.57 (7.35)	**$F_{(2, 39)} = 9.602$, p < 0.001 G2 – G0 = 12.91, p < 0.001**

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

(continued)

Couples' similarity in illness perceptions –	42 patients' in-hospital moods in three groups : Mean (SD) Mod	Both disagree	With different opinions	Both agree	F value & post hoc results	Couples' similarity in illness perceptions -	42 spouses' in-hospital moods in three groups during patients' hospitalisation: Mean (SD)	Both disagree	With different opinions	Both agree	F/ Post hoc results
Timeline	Depression	11.70 (8.97) (n = 10)	16.40 (8.20) (n = 20)	14.58 (10.41) (n = 12)	$F_{(2, 39)} = 0.902$, p = 0.414	Timeline	depression	28.60 (15.63) (n = 10)	24.55 (10.79) (n = 20)	20.67 (13.07) (n = 12)	$F_{(2, 39)} = 1.067$, p = 0.354
	State anxiety	27.67 (5.22)	33.83 (13.12)	36.94 (10.68)	$F_{(2, 39)} = 1.971$, p = 0.153		State anxiety	55.67 (16.11)	50.17 (17.32)	40.00 (15.63)	$F_{(2, 39)} = 2.611$, p = 0.086
	Positive affect	24.60 (6.75)	28.55 (7.67)	28.50 (7.39)	$F_{(2, 39)} = 1.079$, p = 0.350		Positive affect	26.90 (6.79)	29.60 (8.62)	30.92 (6.07)	$F_{(2, 39)} = 0.792$, p = 0.460
	Negative affect	16.80 (5.49)	19.30 (7.67)	22.58 (12.61)	$F_{(2, 39)} = 1.161$, p = 0.324		Negative affect	29.70 (9.41)	29.25 (8.14)	24.00 (6.93)	$F_{(2, 39)} = 1.898$, p = 0.163
Control component 1: Active control	Depression	18.56 (12.97) (n = 9)	12.79 (7.43) (n = 14)	14.42 (7.78) (n = 19)	$F_{(2, 39)} = 1.152$, p = 0.327	Control component 1: Active control	depression	23.56 (12.05) (n = 9)	21.29 (12.92) (n = 14)	27.11 (12.95) (n = 19)	$F_{(2, 39)} = 0.864$, p = 0.430
	State anxiety	38.89 (15.09)	32.62 (9.97)	31.05 (9.88)	$F_{(2, 39)} = 1.535$, p = 0.228		State anxiety	48.52 (14.64)	45.24 (15.56)	51.05 (19.75)	$F_{(2, 39)} = 0.447$, p = 0.643
	Positive affect	28.56 (6.48)	25.79 (5.86)	28.47 (8.80)	$F_{(2, 39)} = 0.616$, p = 0.545		Positive affect	28.67 (8.40)	28.50 (5.11)	30.26 (8.79)	$F_{(2, 39)} = 0.256$, p = 0.775
	Negative affect	23.33 (8.47)	15.43 (4.15)	21.00 (10.86)	$F_{(2, 39)} = 2.713$, p = 0.079		Negative affect	24.00 (6.60)	26.07 (8.56)	31.00 (8.05)	$F_{(2, 39)} = 2.895$, p = 0.067
Control component 2: Passive control	Depression	12.90 (6.59) (n = 10)	14.47 (10.43) (n = 15)	16.12 (9.22) (n = 17)	$F_{(2, 39)} = 0.400$, p = 0.673	Control component 2: Passive control	Depression	19.00 (11.71) (n = 10)	23.13 (12.58) (n = 15)	28.71 (12.63) (n = 17)	$F_{(2, 39)} = 2.050$, p = 0.142
	State anxiety	32.00 (9.45)	35.11 (14.13)	32.35 (9.91)	$F_{(2, 39)} = 0.306$, p = 0.738		State anxiety	41.00 (14.23)	44.67 (16.85)	56.47 (16.77)	$F_{(2, 39)} = 3.528$, p = 0.039
	Positive affect	25.80 (6.97)	29.47 (6.97)	27.00 (8.06)	$F_{(2, 39)} = 0.821$, p = 0.447		Positive affect	30.40 (5.42)	32.47 (6.11)	25.94 (8.60)	$F_{(2, 39)} = 3.508$, p = 0.040
	Negative affect	16.20 (7.50)	21.67 (11.00)	19.88 (7.68)	$F_{(2, 39)} = 1.122$, p = 0.336		Negative affect	23.00 (7.73)	27.80 (7.50)	30.76 (8.39)	$F_{(2, 39)} = 3.018$, p = 0.060
Symptom perception	Depression	10.00 (7.01) (n = 13)	12.38 (6.38) (n = 16)	22.46 (9.06) (n = 13)	**$F_{(2, 39)} = 10.322$, p < 0.001 G2 – G0 = 12.462, p = 0.002 G2-G1 = 10.087, p = 0.008**	Symptom perception	Depression	24.92 (14.55) (n = 13)	25.00 (13.62) (n = 16)	23.15 (10.33) (n = 13)	$F_{(2, 39)} = 0.087$, p = 0.917
	State anxiety	30.00 (6.94)	30.00 (8.94)	40.51 (14.39)	$F_{(2, 39)} = 4.538$, p = 0.017		State anxiety	52.31 (18.88)	45.83 (16.80)	48.21 (16.70)	$F_{(2, 39)} = 0.499$, p = 0.611
	Positive affect	28.15 (8.50)	27.13 (7.27)	27.62 (6.95)	$F_{(2, 39)} = 0.066$, p = 0.936		Positive affect	27.00 (6.77)	29.69 (7.60)	31.23 (8.11)	$F_{(2, 39)} = 1.058$, p = 0.357
	Negative affect	16.85 (6.49)	16.81 (7.36)	25.92 (10.27)	**$F_{(2, 39)} = 5.606$, p = 0.007 (but no significant post hoc)**		Negative affect	28.85 (9.02)	27.38 (9.27)	27.46 (6.77)	$F_{(2, 39)} = 0.128$, p = 0.880
Future MI threat	Depression	14.50 (9.31) (n = 6)	14.21 (8.16) (n = 14)	15.18 (9.84) (n = 22)	$F_{(2, 39)} = 0.050$, p = 0.952	Future MI threat	Depression	30.50 (12.72) (n = 6)	27.43 (10.18) (n = 14)	20.82 (13.53) (n = 22)	$F_{(2, 39)} = 2.061$, p = 0.141
	State anxiety	34.44 (9.81)	29.29 (8.18)	35.45 (13.03)	$F_{(2, 39)} = 1.330$, p = 0.276		State anxiety	55.00 (12.43)	48.57 (13.82)	46.82 (20.22)	$F_{(2, 39)} = 0.520$, p = 0.599
	Positive affect	31.33 (1.63)	26.86 (9.16)	27.05 (7.05)	$F_{(2, 39)} = 0.891$, p = 0.419		Positive affect	31.50 (5.17)	29.93 (7.61)	28.36 (8.12)	$F_{(2, 39)} = 0.462$, p = 0.633
	Negative affect	21.83 (9.24)	17.21 (7.04)	20.59 (10.06)	$F_{(2, 39)} = 0.800$, p = 0.456		Negative affect	30.00 (8.00)	30.50 (6.27)	25.59 (9.16)	$F_{(2, 39)} = 1.791$, p = 0.180

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Four important findings are reported in Table 10.9:
Firstly, although the couples' dissimilarity on symptom perception and stress causal attribution showed significant F values on the patients' negative affect, and the spouses' depression and negative affect, post hoc tests did not distinguish any significant differences between the three couple groups. This probably was because some groups had larger standard deviation.

Secondly, the patients' depression was distinguished by the couples' symptom perception dissimilarity. If both couples perceived/observed worse symptoms, the patients in that group tended to have a higher level of depression score than the patients in the other two groups did.

Thirdly, the couples' dissimilarity on their physical consequence perceptions distinguished the spouses' negative moods. If both couples believed in worse physical consequences, the spouses in that group tended to report much stronger negative feelings than those spouses who belonged to the group that both couples believed in less serious consequences.

Finally, the spouses from those couples with dissimilar perception of physical consequence perceptions still had higher depression or negative affect than those spouses from the group where both couples had less perception of physical consequences.

Hypothesis testing

H17: Those couples who both believe that an MI will bring the patients serious consequences will be more depressed and anxious than those couples who do not believe so.
As emotional consequence perception focused on the patients' and the spouses' individual perception, but not the patients', this perception component was not used to compare the couples' differences.

Using median score to split couples into three groups of 'both agree', 'both disagree' and 'not similar', it was found that those spouses who were in the group that both couples believed the MI event would bring the patients serious physical consequences reported higher levels of depression, state anxiety and negative affect than other

spouses. However, because the same finding did not apply to the MI patients, this hypothesis could only be partially supported.

10.6. Will first-time MI couples contribute to each other's moods - A multivariate approach

To explore couples' influences on each other's moods, multivariate hierarchical regressions were used. Demographic data, illness perception components and other mood variables were included as predictors.

The predictor entering order for patients was – patients' demographic data, patients' symptom perception, patients' other mood variables, couples' illness perception differences, spouses' demographic data, spouses' illness perceptions, and spouses' moods. This order is based on the suggestion that symptom perception happens first and then it triggers other illness perception components. According to Common Sense Model of illness (CSMI), illness perceptions influence moods. In addition, respondents' own illness perceptions and other mood variables should influence their dependent mood variables more than the other persons' influences. The most difficult part was to decide where to enter the couples' illness perception differences (defined as "*patients' minus spouses' illness perception*") – Should they be entered at the last of the regression model?

As the couples' illness perception differences were calculated by using both couples' individual illness perceptions, both couples had influences on it. Therefore, it seemed logical to enter the couples' illness perception differences before entering another person's variables, instead of entering the differences at the last step. To check whether two different orders would influence results, both entering orders were conducted and their results remained the same.

The predictor entering order was slightly different for the spouses. The spouses' demographic data was entered first, then their emotional consequence perception, their other mood variables, followed by the remaining illness perception components, then the couples' illness perception differences, patients' demographic data, patients' symptom perception, patients' other illness perceptions and patients' moods. The reasons for splitting the spouses' emotional consequence perception from other illness perceptions was because this perception component was related to the spouses' moods,

but the other illness perceptions were more concerned about the patients' illness. It would be logical to enter this first, then the spouses' other mood variables followed by their other illness perceptions.

10.6.1. Couples' depression

Table 10.10 displays the regression results of the 42 couples' depression.

Table 10. 10. Regression results of the 42 first-time MI couples' depression

Predictors for 42 couples' depression	β	t (42)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Patients –					
Block 1			0.173	0.152	
Patients' education	0.144	1.348			
Block 2			0.494	0.468	31.6***
Patients' symptom perception	0.318	2.323*			
Block 3			0.617	0.576	10.8**
Patients' consequence perception component 1: physical consequences	0.329	2.563*			
Patients' consequences perception component 2: emotional consequences	-0.068	-0.540			
Block 4			0.664	0.617	4.1*
Patients' state anxiety	0.289	2.277*			
Block 5			0.673	0.617	0.0
Spouses' symptom perception	0.127	1.002			
F (6, 35) = 12.002, p < 0.001					
Spouses –					
Block 1			0.171	0.151	
Spouses' age	-0.023	-0.209			
Block 2			0.601	0.581	43.0***
Spouses' consequence perception component 2: emotional consequences	0.444	3.343**			
Block 3			0.689	0.664	8.3**
Spouses' state anxiety	0.421	3.753***			
Block 4			0.722	0.683	1.9
Spouses' causal component 1: stress	-0.148	-1.207			
Spouses' consequence perception 1: physical consequences	0.260	1.997			
F (5, 36) = 18.705, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Although different types of illness perceptions contributed differently to the 42 couples' depression, in general their individual illness perceptions explained over 40% of the variance before entering their other mood variables. This was particularly obvious for the spouses, as the spouses' emotional consequence perception further added 43% of the variance of their depression. After the spouses' state anxiety was entered, their emotional consequence perception was still significant.

Even after the other mood variables were entered, some illness perceptions remained significant for both couples. For example, the patients' physical consequence perception (p = 0.011) and symptom perception (p = 0.001) remained significant at step 3, although the entry of their spouses' symptom perception did not help explaining depression. After

entering the patients' anxiety, physical consequences and symptom perception remained significant.

In terms of the spouses' depression, their emotional consequence perception significantly contributed to their depression, no matter whether their anxiety was considered first ($p < 0.001$) or not.

10.6.2. Couples' anxiety

Table 10.11 displays the explanations of the 42 couples' anxiety. Overall, before considering other mood variables, their individual illness perceptions significantly explained at least 30% of their individual anxiety. After considering other mood variables, the roles of the spouses' illness perceptions were not as significant as the spouses' other mood variables, but for the patients, some illness perceptions (e.g., timeline and symptom perception) remained significant.

Table 10. 11. Regression results of the 42 first-time MI couples' state anxiety

Predictors	β	t (42)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Patients –					
Block 1			0.303	0.285	
Patients' symptom perception	0.312	2.301*			
Block 2			0.539	0.502	21.7***
Patients' 'emotional consequences' perception	0.121	1.045			
Patients' 'timeline' perception	0.351	3.200**			
Block 3			0.598	0.554	5.2*
Patients' depression	0.337	2.326*			
F (4, 37) = 13.734, p < 0.001					
Spouses –					
Block 1			0.339	0.323	
Spouses' 'emotional consequences' perception	0.089	0.475			
Block 2			0.545	0.509	18.6***
Spouses' depression	0.499	2.825**			
Spouses' positive affect	-0.247	-2.174*			
Block 3			0.558	0.510	0.1
Spouses' 'stress' causal perception	0.139	1.034			
F (4 37) = 11.663, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

The MI patients' timeline perception ($p = 0.001$) and symptom perception ($p < 0.001$) significantly contributed to their anxiety before depression was entered. When their depression was entered into the regression model after illness perceptions, both

timeline and symptom perceptions remained significant and timeline played a more important role than depression.

The spouses' mood variables seemed to be more important than the couples' illness perceptions. The spouses' emotional consequence perception was suppressed (from p = 0.004 to p = 0.638) after depression and positive affect were entered, and both of these two moods significantly contributed to spouses' anxiety.

10.6.3. Couples' positive affect

Table 10.12 presents the 42 couples' positive affect.

Table 10. 12. Regression results of the 42 first-time MI couples' positive affect

Predictors	β	t (42)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Patients –					
Block 1			0.161	0.140**	
Spouses' age	-0.401	-2.769**			
F (1, 40) = 7.669, p = 0.008					
Spouses –					
Block 1			0.155	0.134	
Spouses' state anxiety	-0.291	-1.954			
Block 2			0.236	0.196	6.2*
Spouses' 'uncontrollable (external)' causal perception	-0.302	-2.025*			
F (2, 39) = 6.007, p = 0.005					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

None of the 42 patients' illness perceptions significantly correlated with their positive affect. However, their spouses' 'age' alone contributed 14% of variance to the patients' positive affect. This indicated the older the spouses, the less positive affect these patients had.

Regarding the spouses' positive affect, only the spouses' uncontrollable/external causal attribution significantly contributed to it, no matter whether their state anxiety was entered or not. Unlike their negative feelings, the spouses' positive affect was not significantly explained by their other mood variables, and their state anxiety only added another 5.6% of the variance after uncontrollable/external causal attribution was entered into the regression.

10.6.4. Couples' negative affect

Table 10.13 displays the regression results of the 42 couples' negative affect.

Table 10. 13. Regression results of the 42 first-time MI couples' negative affect

Predictors	β	t (42)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Patients –					
Block 1			0.278	0.260	
Patients' symptom perception	0.277	2.137*			
Block 2			0.519	0.481	22.1***
Patients' 'physical consequences' perception	0.310	2.260*			
Patients' 'emotional consequences' perception	0.148	1.056			
Block 3			0.566	0.519	3.8
Patients' state anxiety	0.281	2.002			
F (4 37) = 12.057 0.001					
Spouses –					
Block 1			0.217	0.198	
Spouses' age	-0.233	-1.812			
Block 2			0.541	0.518	
Spouses' 'emotional consequences' perception	0.525	3.388**			
Block 3			0.611	0.580	
Spouses' state anxiety	0.317	2.418*			
Block 4			0.621	0.569	
Spouses' 'stress' causal perception	-0.039	-0.271			
Spouses' 'physical consequences' perception	-0.122	-0.805			
F (5, 36) = 11.813, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

The MI patients' physical consequence perception and symptom perception contributed a lot to the patients' negative affect. Illness perceptions alone explained 48.1% of the variance.

For the spouses, it was found that their emotional consequence perception contributed significantly to their negative affect, no matter whether their anxiety was entered or not. Although state anxiety was a significant predictor, it only explained another 5.6% of the variance after illness perceptions were accounted for.

In summary, the 42 patients' symptom perception contributed significantly to their negative moods. Their negative moods also played important roles. For the spouses, their emotional consequence perception was a stronger predictor of their own moods when comparing with other illness perceptions, although relevant moods also contributed to their negative feelings.

10.7. Conclusion

This chapter described the 42 first-time MI couples' moods and illness perceptions during the patients' hospitalisation. The spouses reported a higher level of negative affect than the patients and none of the couples' moods significantly correlated with each other. Both couples tended to endorse 'stress', 'high cholesterol' and 'bad luck/chance' as three of their top five causes of the MI. There was no significant difference between the couples' illness perceptions and there were significant positive correlations between the couples on the same type of illness perception components. However, some spouses reported stronger negative moods than others if both couples had stronger negative views of stress causal attribution and physical consequences; and some patients felt more depressed and negative than others if both couples believed in serious symptom perception. Finally, the patients' and the spouses' own illness perceptions contributed more significantly to their own moods instead of their partners' moods.

CHAPTER ELEVEN – GOING THROUGH IT TOGETHER II: FIRST-TIME MI COUPLES' RESPONSES DURING THE FIRST SIX MONTHS

This chapter describes those first-time MI couples who completed three assessments within the first six months. The description includes couples' moods, illness perceptions, social support and coping. Data were collected during patients' hospitalisation (4-5 days post-MI), at 4-8 weeks post-MI (time 2) and at 6 months post-MI (time 3).

Seven couples (17%) dropped out from this study for the following reasons:
Two patients died;
One patient divorced his spouse after assessment 2;
Two patients refused the follow-ups after assessment 1 and assessment 2;
One patient suffered a serious stroke after assessment 1;
One spouse endured other medical problems after assessment 2.

Therefore, current results were based on the 35 first-time MI couples, with the patients' mean age = 61.06 ± 11.82 (rang 41 – 80) and the spouses' mean age = 57.69 ± 12.17 (range 34 – 80).

11.1. What are MI couples' moods during the first six months?

Couples' depression

Table 11.1 illustrates the MI couples' depression over the first six months.

Table 11. 1. Repeated measures ANOVA on the 35 MI couples' depression

Depression (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA with each group (Time effect only)
Patients	15.17 (9.52)	12.49 (8.48)	11.03 (7.81)	$F_{(2, 68)} = 4.387$, $p = 0.016$
Spouses	25.40 (13.19)	19.37 (14.94)	15.74 (13.11)	$F_{(2, 68)} = 14.828$, $p < 0.001$ Post hoc: t1 – t2 = 6.03, p = 0.002; t1 – t3 = 9.66, p < 0.001
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 18.65$, $p < 0.001$ (t1 – t2 = 4.36, p = 0.001; t1 – t3 = 6.9, p < 0.001) Group: $F_{(1, 68)} = 9.120$, $p = 0.004$ (mean: spouse – patient = 7.28, p = 0.004) (post hoc - t1: spouse – patient = 10.23, t value = 3.721, p < 0.001) Interaction: $F_{(2, 136)} = 2.954$, $p = 0.055$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When examining patients and spouses separately, the patients' depression remained stable, but the spouses' depression decreased significantly. Post hoc comparisons showed the spouses' baseline depression was much higher than that of time 2 and time 3.

When MI couples were examined together, no significant 'interaction' effect was found, but 'time' and 'group' effects were both significant. Their average depression score decreased significantly. Post hoc comparisons showed baseline depression was much higher than that of time 2 and time 3. Since patients' time effect was not significant, the combined time effect probably was caused by the decrease of spouses' depression.

The significant group effect suggested that patients' average depression score was much lower than their spouses' score. Further independent t-tests showed the couples' difference occurred at time 1, but not at time 2 ($t_2 = 2.372$, $p = 0.021$, ns) or time 3 ($t_3 = 1.828$, $p = 0.073$, ns). However, after the confounding variable, 'gender', was controlled for, the significant difference between the MI couples at baseline disappeared (Appendix E-1).

Couples' state anxiety

Table 11.2 displays the couples' anxiety over six months.

Table 11. 2. Repeated measures ANOVA on the 35 MI couples' state anxiety

State anxiety (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	33.33 (11.83)	33.43 (12.72)	33.14 (10.99)	$F_{(2, 68)} = 0.010$, $p = 0.990$
Spouses	49.43 (17.76)	47.05 (17.76)	43.14 (15.96)	$F_{(2, 68)} = 3.127$, $p = 0.050$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 1.989$, $p = 0.141$ Group: $F_{(1, 68)} = 19.816$, $p < 0.001$ (mean: spouse – patient = 13.24, $p < 0.001$) (Post hoc: t1: spouse – patient = 16.10, t value = 4.463, $p < 0.001$; t2: spouse – patient = 13.62, t value = 3.688, $p < 0.001$; t3: spouse – patient = 10.00, t value = 3.052, $p = 0.003$) Interaction: $F_{(2, 136)} = 1.733$, $p = 0.181$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the 35 couples were examined separately, there was no significant time effect for both groups, which indicated both groups' anxiety level remained unchanged over time.

When the 35 couples were examined together, although 'interaction' and 'time' effects were also not significant, 'group' effect was significant. This implied on average, the spouses' state anxiety was significantly higher than that of the patients' anxiety score.

Further independent t-tests showed the spouses had much higher state anxiety than the patients at every assessment. However, after 'gender' was controlled for, it was no longer significant. Therefore, one could not conclude that the MI spouses were more anxious than the patients were during the first six months post-MI (Appendix E-1).

Couples' positive affect

Table 11.3 presents the 35 couples' positive affect over the first six months.

Table 11. 3. Repeated measures ANOVA on the 35 MI couples' positive affect

Positive affect (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	27.94 (7.60)	28.83 (8.49)	30.14 (7.97)	$F_{(2, 68)} = 1.216$, $p = 0.303$
Spouses	29.51 (7.91)	29.40 (7.65)	31.46 (9.44)	$F_{(2, 68)} = 2.259$, $p = 0.112$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 2.991$, $p = 0.054$ Group: $F_{(1, 68)} = 0.481$, $p = 0.490$ Interaction: $F_{(2, 136)} = 0.166$, $p = 0.847$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

During the first six months, both couples had similar levels of low positive affect than the published normative data (score was around 32 – 33, Watson et al., 1988). When the couples were examined together, their 'interaction', 'time' and 'group' effects were not significant. When the couples were examined separately, both couples' 'time' effects were not significant either.

Couples' negative affect

Table 11.4 displays the 35 couples' negative affect over the first six months.

Table 11. 4. Repeated measures ANOVA on the 35 MI couples' negative affect

Negative affect (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	20.06 (9.68)	16.91 (6.31)	15.60 (6.59)	$F_{(1.44, 49.09)} = 5.596$, $p = 0.013$
Spouses	27.69 (8.82)	21.74 (11.18)	18.66 (9.79)	$F_{(2, 68)} = 23.705$, $p < 0.001$ Post hoc: t1 – t2 = 5.94, $p < 0.001$; t1 – t3 = 9.09, $p < 0.001$)
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(1.78, 121.19)} = 25.719$, $p < 0.001$ (t1 – t2 = 4.54, $p < 0.001$; t1 – t3 = 6.74, $p < 0.001$) Group: $F_{(1, 68)} = 8.113$, $p = 0.006$ (mean: spouse – patient = 5.17, $p = 0.006$) (post hoc: t1: spouse – patient = 7.63, t value = 3.447, $p = 0.001$) Interaction: $F_{(1.78, 121.19)} = 2.889$, $p = 0.066$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

Overall, both MI couples' negative affect decreased over time, but the spouses always reported a higher level of negative affect than the patients did. When examining the couples' negative affect separately, the spouses' negative affect decreased significantly. Although the patients also showed a decreasing tendency, it was not significant. During the patients' hospitalisation, their spouses experienced a higher level of negative affect when they were compared with the published norm group (mean = 17.4). Only at six months later, the 35 spouses' negative affect decreased to be at a similar level of norm group (mean = 19.5). Post hoc comparisons revealed the spouses' score significantly dropped between time 1 to time 2 and between time 1 to time 3.

When the couples were examined together, no significant interaction effect was found. However, the significant time effect indicated their average negative affect decreased over time. Their negative affect was much higher at time 1 than time 2 and time 3. Besides, the significant group effect indicated that on average the spouses had higher negative affect than the patients. Further independent t-tests revealed the couples' difference occurred at time 1, but not at the follow-up assessments (t_2 = 2.226, p = 0.030, ns; t_3 = 1.536, p = 0.129, ns). However, after controlling for 'gender', this significant difference disappeared. This finding was contrary to what was found on the 42 MI couples' in-hospital negative affect, where after controlling for 'gender', the spouses still had a higher level of negative affect than the patients (Appendix E-1).

Hypothesis testing

H15: MI patients will have higher levels of depression and anxiety than their spouses.
Although findings from the above analyses showed that the MI patients' depression and state anxiety were lower than their partners' at each assessment, it did not mean that spouses experienced higher levels of depression and state anxiety than the MI patients. Most of the spouses in this study were females, and females tended to have a higher level of distressful emotions, 'gender' should be controlled for as a confounding variable. The final results revealed that after controlling for gender, none of the couples' depression and state anxiety showed any significant difference at each assessment. Therefore this hypothesis was not supported.

In summary, during the first six months post-MI, the patients' depression, state anxiety and negative affect remained stable but their partners' depression and negative affect decreased significantly (Table 11.5). Although it the spouses seemed to have worse

negative moods, after controlling for 'gender', there were no significant differences between the couples' negative moods.

Table 11. 5. Summary of the 35 MI couples' moods over the first six months post-MI

	Combine couples together				Patient alone	Spouse alone
	Time effect	Group effect	Group effect after 'gender' was controlled for	Interaction	Time effect	Time effect
Depression	Decrease	v	--	--	--	Decrease
State anxiety	--	v	--	--	--	--
Positive affect	--		--	--	--	--
Negative affect	Decrease	v	--	--	--	Decrease

11.2. What are MI couples' illness perceptions during the first six months?

11.2.1. Couples' causal attributions

The 35 couples' three causal attribution components during the first six months post-MI are displayed in Table 11.6 – Table 11.8. Again, the couples' differences in illness perceptions are defined as "*patients' minus spouses' illness perceptions*".

Stress causal component

Table 11.6 presents the 35 couples' stress causal attribution over six months.

Table 11. 6. Repeated measures ANOVA on the 35 MI couples' 'stress' causal component

Causal component 1: Stress (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	2.48 (0.64)	2.66 (0.79)	2.47 (0.59)	$F_{(2, 68)} = 2.047$, $p = 0.137$
Spouses	2.69 (0.68)	2.68 (0.63)	2.70 (0.71)	$F_{(2, 68)} = 0.024$, $p = 0.977$
Couples' difference (patient – spouse)	-0.21 (0.59)	-0.02 (0.67)	-0.23 (0.71)	$F_{(2, 68)} = 1.536$, $p = 0.223$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 1.120$, $p = 0.329$ Group: $F_{(1, 68)} = 1.241$, $p = 0.269$ Interaction: $F_{(2, 136)} = 1.524$, $p = 0.221$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

The couples had a similar level of belief in 'stress' causal component over time. None of their 'stress' causal component changed significantly. When the couples were examined together, none of the 'interaction', 'time' and 'group' effects was significant.

External/uncontrollable causal component

Table 11.7 presents the 35 couples' external/uncontrollable causal perception.

Table 11. 7. Repeated measures ANOVA on the 35 MI couples' external/uncontrollable causal component

Causal component 2: External/uncontrollable causes (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	2.68 (0.70)	2.51 (0.69)	2.61 (0.68)	$F_{(2, 66)} = 0.843$, $p = 0.435$
Spouses	2.71 (0.68)	2.68 (0.65)	2.58 (0.70)	$F_{(1.55, 52.73)} = 0.758$, $p = 0.442$
Couples' difference (patient – spouse)	-0.03 (0.66)	-0.17 (0.67)	0.03 (0.84)	$F_{(2, 66)} = 0.854$, $p = 0.430$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 0.900$, $p = 0.409$ Group: $F_{(1, 68)} = 0.195$, $p = 0.660$ Interaction: $F_{(2, 136)} = 0.717$, $p = 0.490$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the couples were examined separately, both of their 'uncontrollable/external' causal attribution remained stable. When the couples were examined together, there was no significant 'interaction', 'time' and 'group' effects either.

Unhealthy lifestyles/behaviours causal component

Table 11.8 illustrates the 'unhealthy lifestyles/behaviours' causal attribution component.

Table 11. 8. Repeated measures ANOVA on the 35 MI couples' 'unhealthy lifestyles' causal component

Causal component 3: Unhealthy lifestyles (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	2.67 (0.66)	2.85 (0.81)	2.89 (0.82)	$F_{(1.63, 55.32)} = 2.498$, $p = 0.102$
Spouses	2.84 (0.72)	2.84 (0.87)	2.88 (0.90)	$F_{(2, 68)} = 0.073$, $p = 0.930$
Couples' difference (patient – spouse)	-0.17 (0.55)	0.01 (0.99)	0.01 (0.77)	$F_{(2, 68)} = 1.162$, $p = 0.319$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(1.81, 123.11)} = 1.655$, $p = 0.198$ Group: $F_{(1, 68)} = 0.082$, $p = 0.775$ Interaction: $F_{(1.81, 123.11)} = 0.994$, $p = 0.366$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the couples were examined separately, none of them changed their perceptions on 'unhealthy lifestyle' causes over time. When the couples were examined together, none of the 'interaction', 'time' or 'group' effects was significant either.

11.2.2. Couples' perceptions of consequences, timeline, control, future MI threat and symptom

Physical consequence perception

Table 11.9 displays the 35 couples' perceptions in 'physical consequences over time.

Table 11. 9. Repeated measures ANOVA on the 35 MI couples' 'physical consequence' perception

Consequence component 1: Physical consequences (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	2.87 (0.63)	2.87 (0.64)	2.97 (0.68)	$F_{(2, 68)} = 0.660$, $p = 0.520$
Spouses	2.96 (0.74)	3.05 (0.62)	3.09 (0.68)	$F_{(1.65, 56.96)} = 0.755$, $p = 0.451$
Couples' difference (patient – spouse)	-0.09 (0.73)	-0.18 (0.72)	-0.12 (0.79)	$F_{(2, 68)} = 0.236$, $p = 0.790$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 1.222$, $p = 0.298$ Group: $F_{(1, 68)} = 0.953$, $p = 0.332$ Interaction: $F_{(2 136)} = 0.192$, $p = 0.826$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

The couples had a similar degree of agreement on physical consequences perception over time. When examining the couples together, no significant 'interaction', 'time' and 'group' effects were found. When the 35 couples were examined separately, both groups showed no significant changes over time.

Emotional consequence perception

As this perception component was related to MI couples' individual emotional consequence perception instead of the patient's emotions, the couples' differences were not examined. Table 11.10 presents the couples' individual perceptions of emotional consequences.

Table 11. 10. Repeated measures ANOVA on the 35 MI couples' 'emotional consequence' perception

Consequence component 2: Emotional consequences (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	3.24 (0.68)	3.13 (0.76)	3.10 (0.69)	$F_{(2, 68)} = 0.890$, $p = 0.416$
Spouses	3.65 (0.76)	3.48 (0.69)	3.26 (0.63)	$F_{(1.86, 56.43)} = 7.522$, $p = 0.002$ (post hoc: t1 – t3 = 0.39, $p = 0.008$)
F value of mixed repeated measures ANOVA (Time, group, time x group)	Time: $F_{(1.79, 121.61)} = 6.251$, $p = 0.004$ (t1 – t3 = 0.267, $p = 0.009$) Group: $F_{(1, 68)} = 4.406$, $p = 0.040$ Interaction: $F_{(1.79\ 121.61)} = 1.477$, $p = 0.233$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the couples were examined separately, patients' emotional consequence perception did not change over time but their spouses had a significant decline. Post hoc comparisons indicated the spouses' emotional consequence perception at time 3 was much lower than that of time 1.

When the couples were examined together, no significant 'interaction' and 'group' effects were found, but 'time' effect was significant. Post hoc comparisons implied the couples' average emotional consequence perception decreased from time 1 to time 3. However, this finding should be treated with caution as simple repeated measures ANOVAs had shown that only the spouses had a decreasing tendency on this perception.

Timeline perception

The 35 couples' individual perceptions about how long the MI would last (timeline) are presented in Table 11.11.

Table 11. 11. Repeated measures ANOVA on the 35 MI couples' 'timeline' perception

Timeline perception component (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	3.01 (0.65)	3.05 (0.70)	3.33 (0.62)	$F_{(2, 68)} = 6.714$, $p = 0.002$ ($t3 - t1 = 0.326$, $p = 0.013$; $t3 - t2 = 0.28$, $p = 0.012$)
Spouses	2.94 (0.77)	3.18 (0.59)	3.47 (0.54)	$F_{(1.58, 53.81)} = 11.641$, $p < 0.001$ ($t3 - t1 = 0.531$, $p = 0.001$; $t3 - t2 = 0.286$, $p = 0.005$)
Couples' difference (patient – spouse)	0.07 (0.87)	-0.13 (0.75)	-0.14 (0.76)	$F_{(1.52, 51.67)} = 1.426$, $p = 0.248$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(1.75, 118.83)} = 17.738$, $p < 0.001$ ($t3 - t1 = 0.429$, $p < 0.001$; $t3 - t2 = 0.284$, $p < 0.001$) Group: $F_{(1, 68)} = 0.263$, $p = 0.610$ Interaction: $F_{(1.75, 118.83)} = 1.282$, $p = 0.279$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

The patients' timeline perception increased significantly, although post hoc comparisons only showed a borderline difference between time 1 vs. time 3, and time 2 vs. time 3.

The 35 spouses' timeline perception also increased significantly. Post hoc comparisons revealed a significant increase between time 1 vs. time 3 and time 2 vs. time 3.

When the couples were examined together, no significant 'interaction' and 'group' effects were found. 'Time' effect was significant. Post hoc comparisons showed the couples' timeline perception at time 3 was significantly higher than that of time 1 and time 2.

Active control perception

Table 11.12 presents the 35 couples' perceptions of active control.

Table 11. 12. Repeated measures ANOVA on the 35 MI couples' 'active control' perception

Control component 1: Active control (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	3.92 (0.48)	3.84 (0.55)	3.83 (0.38)	$F_{(2, 68)} = 0.650$, p = 0.525
Spouses	4.01 (0.70)	3.78 (0.49)	3.72 (0.61)	$F_{(1.59, 54.11)} = 5.089$, p = 0.015
Couples' difference (patient – spouse)	-0.09 (0.57)	0.06 (0.71)	0.11 (0.63)	$F_{(2, 68)} = 1.674$, p = 0.195
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 4.906$, p = 0.009 Group: $F_{(1, 68)} = 0.061$, p = 0.806 Interaction: $F_{(2, 136)} = 1.292$, p = 0.278			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When examining the couples separately, the patients' active control perception did not change significantly, but the spouses' perception change almost reached statistical significance.

When both couples were considered together, 'time effect' became significant. However, (maybe due to small sample size), post hoc comparisons showed no significance between the three assessments. There was no significant 'interaction' and 'group' effects.

Passive control perception

Table 11.13 presents the 35 couples' perceptions of passive control over the first six months post-MI.

Table 11. 13. Repeated measures ANOVA on the 35 MI couples' 'passive control' perception

Control component 2: Passive control (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	2.54 (0.70)	2.45 (0.59)	2.41 (0.59)	$F_{(2, 68)} = 0.996$, p = 0.375
Spouses	2.59 (0.56)	2.34 (0.57)	2.36 (0.50)	$F_{(2, 68)} = 4.692$, p = 0.012
Couples' difference (patient – spouse)	-0.05 (0.84)	0.11 (0.69)	0.05 (0.58)	$F_{(2, 68)} = 0.693$, p = 0.504
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 4.835$, p = 0.009 Group: $F_{(1, 68)} = 0.091$, p = 0.763 Interaction: $F_{(2, 136)} = 0.868$, p = 0.422			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the 35 couples were examined separately, the patients' passive control perception did not change but the spouses became less convinced that the MI could not be cured or controlled properly.

When the couples were examined together, 'interaction' and 'group' effects were not significant but 'time' effect was significant. However, (maybe because only the spouses' perception decreased significantly but not the patients'), there was no significant post hoc comparison.

Future MI threat

The 35 MI couples' fear of future MI over the first six months is presented in Table 11.14. The results indicated the couples had similar attitudes toward how possible the patients may have another MI. When the patients were examined alone, their threat perception did not change significantly, and the same finding applied to the spouses. When the couples were examined together, 'interaction', 'time' and 'group' effect were non-significant.

Table 11. 14. Repeated measures ANOVA on the 35 MI couples' future MI threat

Future MI threat (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	2.69 (0.99)	2.71 (0.86)	2.91 (0.82)	$F_{(2, 68)} = 0.888$, $p = 0.416$
Spouses	2.91 (0.89)	3.17 (1.04)	2.91 (1.15)	$F_{(2, 68)} = 0.918$, $p = 0.404$
Couples' difference (patient – spouse)	-0.22 (1.21)	-0.46 (1.27)	0.00 (1.24)	$F_{(2, 68)} = 1.474$, $p = 0.236$
F value of mixed repeated measures ANOVA (Time, group, time x group)	Time: $F_{(2, 136)} = 0.551$, $p = 0.578$ Group: $F_{(1, 68)} = 2.046$, $p = 0.157$ Interaction: $F_{(2, 136)} = 1.260$, $p = 0.287$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

Symptom perception

Table 11.15 displays the 35 patients' perceived symptoms and the 35 spouses' observed symptoms.

Over time, both couples identified more symptoms that were related to MI. When the couples were examined separately, only the spouses' observed score increased significantly. Post hoc comparisons showed the spouses' observed symptoms at time 3 was higher than what they had observed at time 2 and time 1.

Table 11. 15. Repeated measures ANOVA on the 35 MI couples' symptom perceptions

Symptom perception (mean, SD)	T1	T2	T3	F value of simple repeated measures ANOVA within each group (Time effect only)
Patients	7.94 (6.30)	10.69 (6.20)	11.11 (6.63)	$F_{(2, 68)} = 3.792$, $p = 0.027$
Spouses	9.60 (6.95)	10.94 (4.82)	13.60 (6.50)	$F_{(1.66, 56.27)} = 9.351$, $p = 0.001$ ($t3 - t2 = 2.543$, $p = 0.005$; $t3 - t1 = 4.00$, $p = 0.003$)
Couples' difference (patient – spouse)	-1.66 (5.81)	-0.25 (4.50)	-2.49 (5.87)	$F_{(2, 68)} = 1.546$, $p = 0.220$
F value of repeated measures ANOVA (Time, group, time x group)	Time: $F_{(1.71, 116.40)} = 10.628$, $p < 0.001$ ($t3 - t1 = 3.586$, $p = 0.001$) Group: $F_{(1, 68)} = 1.506$, $p = 0.224$ Interaction: $F_{(1.71, 116.40)} = 1.042$, $p = 0.347$			

T1: hospitalisation; T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the couples were examined together, only 'time' effect was significant. Post hoc comparisons indicated that on average, these couples reported more symptoms at time 3 than time 1.

In summary, the MI patients' illness perceptions did not change significantly, except that these patients seemed to believe more that their illness would take a longer time to recover. However, it is not clear whether these patients had regarded their illness as a chronic condition or an acute episode.

Their spouses also had a similar attitude on timeline and these spouses became less convinced that the illness could be controlled. However, their beliefs of serious emotional consequences and passive control had weakened after six months post event (Table 11.16).

Table 11. 16. Summary of the 35 MI couples' illness perceptions over the first six months

	Combine couples together			Patient alone	Spouse alone
	Time effect	Group effect	interaction	Time effect	Time effect
Causal component 1: Stress					
Causal component 2: Uncontrollable (external) causes					
Causal component 3: Unhealthy lifestyles					
Consequence component 1: Physical consequences					
Consequence component 2: Emotional consequences	Decrease				Decrease
Timeline	Increase			Increase	Increase
Control component 1: Active control	Decrease				Decrease
Control component 2: Passive control	Decrease				Decrease
Future MI threat					
Symptom perception	Increase				Increase

11.3. How do first-time MI couples perceive social support and what coping strategies do they use during the first six months post-MI?

MI couples' social support

Table 11.17 displays the 35 MI couples' social support at 4-8 weeks and 6-month post-MI (Appendix E-2).

Table 11. 17. Significant repeated measures ANOVAs on the 35 MI couples' social support

	Patient (M.SD)	Spouse (M, SD)	Couples together (time, group, interaction, couples' independent t-tests at t2 & t3)
Total support –			
T2	74.66 (7.70)	66.14 (12.10)	Group: $F_{(1, 68)} = 16.361$, $p < 0.001$
T3	71.63 (6.65)	62.40 (15.97)	(post hoc: patient – spouse = 8.871, $p < 0.001$)
			t-tests: t2 = 3.513, p = 0.001 (patient – spouse = 8.514)
			t-tests: t3 = 3.155, p = 0.003 (patient – spouse = 9.229)
Special one's –			
T2	26.46 (1.98)	22.63 (5.63)	Group: $F_{(1, 68)} = 17.896$, $p < 0.001$
T3	25.77 (2.24)	21.43 (6.79)	(Post hoc comparison: patient – spouse = 4.086 $p < 0.001$)
			t-tests: t2 = 3.799, $p < 0.001$ (patient – spouse = 3.829)
			t3 = 3.593, p = 0.001 (patient – spouse = 4.343)
Family's support			
T2	25.06 (4.43)	23.17 (4.31)	
T3	24.23 (3.07)	21.51 (6.09)	
Friend's support			
T2	23.14 (3.93)	20.34 (5.62)	
T3	21.63 (3.25)	19.46 (6.21)	
Available support			
T2	7.69 (2.31)	6.45 (2.83)	
T3	6.48 (3.19)	6.45 (2.83)	
Desired support			
T2	7.83 (2.64)	7.65 (2.21))	
T3	7.59 (2.54)	7.42 (2.42)	
Support difference-			
T2	-0.14 (2.89)	-1.20 (2.99)	
T3	-1.11 (2.96)	-0.97 (3.59)	

T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

When the couples were examined together, 'group' effect was significant in relation to 'total perceived support' and 'perceived special ones' support'. Post hoc comparisons revealed the 35 patients perceived much more total and special one's support than their spouses did at both time 2 and time 3. When 'gender' was controlled for, the couples' difference on special one's support became non-significant (Appendix E-1).

Therefore, the support that MI couples perceived from different support groups after patients' discharge did not change significantly. The MI patients perceived more total support than their partners did. However, the patients did not perceive more support from a special one when comparing with their partner.

MI couples' coping strategies

Table 11.18 illustrates the 35 couples' top five coping strategies at assessment 2 and 3.

Table 11. 18. The 35 MI couples' top five coping strategies at assessment 2 and 3

	4-8 weeks post-MI		6-month post-MI	
Rank order	Patients	Spouses	Patients	Spouses
1	Acceptance	Acceptance	Acceptance	Acceptance
2	Accepting emotional support	Active coping	Active coping	Active coping
3	Active coping	Planning	Accepting emotional support	Religion
4	Planning	Religion	Planning	Positive reframing
5	Positive reframing	Accepting emotional support	Accepting instrumental support	Planning

At 4-8 weeks post-MI, both 35 couples' top five coping strategies were similar (Table 11.18). The only difference was that the patients used more 'positive reframing', but their spouses used more 'religion'. At 6-month post-MI, both couples still used 'acceptance', 'active coping' and 'planning', but the patients used more 'accepting emotional and instrumental support' and their spouses relied more on 'religion' and 'positive reframing'. Overall, it seemed that both couples were using 'adaptive' coping strategies after patients' discharge.

To examine the changes of the 35 couples' coping strategies over time, Table 11.19 presents significant repeated measures ANOVAs of the couples' coping (Appendix E-3).

Between the second and the third assessment, there was only one strategy changed significantly for the patients and one for the spouses. For the 35 patients, the use of 'accepting emotional support' decreased significantly from time 2 to time 3. For the spouses, the use of 'planning' also decreased significantly.

When the couples were examined together, 'accepting emotional support' and using 'planning' coping both showed a significant 'time' effect. This indicated these two coping strategies decreased from 4-8 weeks to 6-month post-MI. In addition, there were significant differences between the 35 couples on 'accepting emotional support' and on 'humour' coping, even after controlling for gender. This showed that the 35 patients used more humour and accepting emotional support coping strategies than their spouses (Appendix E-1).

Table 11. 19. Significant repeated measures ANOVA on the 35 MI couples' coping strategies

Coping strategies	Patient (M.SD)	Spouse (M, SD)	Individual group' 'time' effect	Couples together (time, group, interaction, couples' independent t-tests at time 2 & time 3)
Active coping				
T1	4.06 (1.73)	3.49 (1.70)		
T2	4.03 (1.67)	3.14 (1.85)		
Denial				
T2	1.43 (1.75)	1.89 (2.37)		
T3	1.00 (1.41)	1.26 (1.87)		
Drug abuse				
T2	0.46 (1.22)	0.37 (0.88)		
T3	0.29 (0.89)	0.60 (1.22)		
Accepting emotional support			Patients:	Time: $F_{(1, 68)} = 14.289$, $p < 0.001$ (post hoc: t1 – t2 = 0.786, $p < 0.001$)
T2	4.31 (1.66)	2.69 (1.92)	$F_{(1, 34)} = 13.256$, $p = 0.001$	Group: $F_{(1, 68)} = 12.995$, $p = 0.001$ (post hoc: patient – spouse = 1.386, p = 0.001)
T3	3.29 (1.95)	2.14 (1.77)	Post hoc: t1 – t2 = 1.029	t-tests: t2 = 3.796, $p < 0.001$ (patient – spouse = 1.629)
Behaviour disengagement				
T2	0.60 (1.04)	0.60 (1.22)		
T3	0.43 (0.85)	0.60 (1.06)		
Positive reframing				
T2	2.83 (1.67)	2.60 (2.05)		
T3	2.60 (1.70)	2.46 (1.44)		
Self-distraction				
T2	2.14 (1.61)	2.23 (1.82)		
T3	2.43 (1.77)	2.23 (2.00)		
Venting				
T2	1.43 (1.70)	1.63 (1.59)		
T3	1.03 (1.36)	1.37 (1.61)		
Accepting instrumental support	2.77 (1.85)	1.97 (1.87)		
T2	2.49 (1.79)	1.43 (1.75)		
T3				
Acceptance				
T2	4.74 (1.52)	4.54 (1.62)		
T3	4.34 (1.51)	4.57 (1.79)		
Self-blame				
T2	1.11 (1.28)	1.00 (1.65)		
T3	0.94 (1.33)	1.17 (1.81)		
Religion				
T2	1.69 (2.44)	2.69 (2.52)		
T3	1.37 (2.16)	2.51 (2.56)		
Humour				
T2	2.66 (2.11)	0.74 (1.20)		Group: $F_{(1, 68)} = 20.406$ $p < 0.001$ (patient – spouse = 1.629, $p < 0.001$)
T3	2.20 (2.07)	0.86 (1.31)		T-tests: t2 = 4.663, $p < 0.001$ (patient – spouse = 1.914); t3 = 3.244, p = 0.002 (patient – spouse = 1.343)
Planning				
T2	3.51 (1.63)	3.43 (1.77)	Spouses:	Time: $F_{(1, 68)} = 9.108$, $p = 0.004$ (post hoc: t1 – t2 = 0.714, p = 0.004,)
T3	3.17 (2.09)	2.34 (1.77)	$F_{(1, 34)} = 11.442$, $p = 0.002$ t1 - t2 = 1.000, , p = 0.002)	

T2: 4-8 weeks post-MI; T3: 6-month post-MI; group: patient or spouse

In conclusion, the most often used coping strategies for these MI couples were those regarded as adaptive strategies, such as active coping, acceptance, and planning. Over time, the frequency of using 'accepting emotional support' for the patients and 'planning' coping for the spouses decreased. The comparisons between couples showed that the patients used more 'accepting emotional support' and 'humour' than their partners.

11.4. Will first-time MI couples influence each other's moods and illness perceptions during the first six months post-MI?

11.4.1. Correlations between MI couples' moods

As none of the MI couples' moods were significantly correlated (Appendix E-4), this suggested that the couples' moods were independent from each other. Further correlation tests showed that for both patients and spouses, their own negative moods (depression, state anxiety and negative affect) positively correlated, and spouses' state anxiety negatively correlated with their own positive affect at each assessment (Appendix E-5 & E-6).

To understand whether the negative feelings would correlate significantly over time, Appendix E-7 & E-8 attach the 35 couples' individual mood correlations over six months. It seemed that for both couples, their individual negative emotions (depression, anxiety & negative affect) had a prolonged influence on each other, and this was more obvious for the spouses.

Hypothesis testing

H16: MI couples' moods, in particular depression and anxiety will positively correlate.
Because none of the couples' moods showed significant correlations at each assessment, this hypothesis was not supported.

11.4.2. Correlations between MI couples' illness perceptions

The correlations of the couples' same types of illness perceptions were examined first. Table 11.20 shows that at baseline, almost all of the couples' same illness perceptions significantly correlated except for 'emotional consequences' component. This suggested that when the patients were in hospital, these couples had similar perceptions on each illness component. The agreement between these couples became less obvious at follow-ups. For example, at time 2, both couples had similar opinions among stress and uncontrollable causal attributions. At time 3, the MI couples tended to only agree on unhealthy lifestyle causes and passive control. Only symptom perception continuously

showed a significant correlation at all three assessments between the couples (Appendix E-9 - Appendix E-15).

Because there were no clear correlation patterns on the MI couples' other illness perceptions, it was difficult to make any conclusive comments. However, Table 11.20 displays that the interactions between the MI couples' illness perceptions may change according to different stages of patients' progress. For example, when admitted to the hospital, the MI patients' perceptions of stress and unhealthy lifestyle causes and serious physical consequences positively correlated with their partners' perception of serious emotional consequences, but at time 2 and time 3, the partners' emotional consequence perception correlated with different perceptions of the patients'.

Table 11. 20. Significant correlations of the 35 MI couples' illness perceptions at each assessment

Time 1	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.603									
External		0.534								
Lifestyle			0.681							
Physical	0.430			0.442						
Emotional	0.659		0.446	0.428						
Timeline										
Active control							0.585			
Passive control										
Future MI threat								0.433		
Symptom perception										0.620

Time 2	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.567									
External		0.496								
Lifestyle										
Physical										
Emotional	0.488							0.460		
Timeline										
Active control										
Passive control										
Future MI threat										
Symptom perception	0.535			0.535	0.512					0.693

Time 3	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress										
External										
Lifestyle			0.603							
Physical										
Emotional				0.468	0.488					0.501
Timeline										
Active control										
Passive control					0.440			0.439		
Future MI threat										
Symptom perception					0.444					0.600

11.4.3. Correlations between MI couples' illness perceptions and moods

Table 11.21 displays the significant correlations between the 35 MI couples' individual moods and each other's moods, illness perceptions and illness perception differences (Appendix E-16 & E-17).

Correlations between the 35 patients' moods and the 35 couples' illness perceptions

In general, at each assessment, the MI patients' negative moods (depression, state anxiety and negative affect) mainly positively correlated with their own negative illness perceptions, in particular the perceptions of symptom and illness consequences. The stronger the patients believed in worse consequences and perceived more symptoms, the stronger negative moods they experienced. The perception of needing a longer recovery time also correlated with their negative moods.

The patients' moods also positively correlated with their partners' observed symptoms. The more symptoms the spouses observed, the more depressed the patients were. In addition, it was found that those patients with a stronger 'passive control' perception than their spouses tended to feel more depressed and negative during their hospitalisation. After 4-8 weeks post-MI, those patients with a stronger belief in 'stress' causal attribution than their spouses also showed higher levels of depression, anxiety and negative affect.

Table 11. 21. Significant correlations between the 35 MI couples' individual moods and illness perceptions at three assessments

	T1: hospitalisation				T2: 4-8 weeks post-MI				T3: 6-month post-MI			
Patients	Depression	State anxiety	Negative affect	**Patients**	Depression	State anxiety	Negative affect	**Patients**	Depression	State anxiety	Positive affect	Negative affect
				Causal component 1: Stress	0.505	0.474	0.556	Causal component 1: Stress		0.506		0.606
Consequence 1: Physical	0.645	0.432	0.564	Consequence 1: Physical	0.602	0.504	0.640					
Consequence 2: Emotional	0.444	0.459	0.533	Consequence 2: Emotional	0.638	0.485	0.593	Consequence 2: Emotional	0.574	0.460		
Timeline		0.500		Timeline			0.435	Timeline		0.422		
Passive control	0.448											
								Future MI threat	0.475			
Symptom perception	0.616	0.585	0.566	Symptom perception	0.605	0.434	0.526	Symptom perception	0.503		-0.494	
Spouses - Symptom perception	0.550			**Spouses -** Symptom perception	0.622		0.556	**Spouses -** Symptom perception	0.466			
Difference of illness perceptions in-				**Difference of illness perception in -**				**Difference of illness perception in -**				
Control 2: Passive control	0.455		0.452	Causal component 1: Stress	0.492	0.477	0.559					

	T1: hospitalisation				T2: 4-8 weeks post-MI				T3: 6-month post-MI			
Spouses	Depression	State anxiety	Negative affect	**Spouses**	Depression	State anxiety	Positive affect	Negative affect	**Spouses**	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	0.497	0.450		Causal component 1: Stress				0.453					
Causal component 2: Uncontrollable (External)		0.441											
Consequence 1: Physical	0.555			Consequence 1: Physical	0.437				Consequence 1: Physical				0.482
Consequence 2: Emotional	0.773	0.584		Consequence 2: Emotional	0.701	0.620		0.689	Consequence 2: Emotional	0.497	0.574		0.572
									Symptom perception	0.439			
Patients - Causal component 1: Stress	0.515			**Patients -** Causal component 1: Stress		0.431			**Patients -** Control 1: Active control			0.541	
				Causal component 2: Uncontrollable (External)			-0.439		Control 2: Passive control			-0.441	

Correlations between the 35 spouses' moods and the 35 couples' illness perceptions

The MI spouses' negative moods mainly positively correlated with their own negative illness perceptions, in particular with the perceptions of serious physical consequences the patients would face and emotional consequences the partners would experience.

In addition, at time 1 and time 2, those partners who attributed the patients' MI to stress causes tended to have stronger negative moods.

The spouses' moods also correlated with a number of the patients' illness perceptions. The stronger the patients attributed their MI to stress causes; the more depressed/anxious the spouses were at time 1/time 2. Also, the more the patients believed in uncontrollable causes, the less positive affect the spouses had at time 2. Finally, the patients' belief in whether their MI could be controlled also correlated with their partners' positive affect at time 3.

11.4.4. Would first-time MI couples' combined illness perceptions influence their individual moods during the first six months post-MI?

As MI can influence both couples, one may wonder whether their dyadic views will correlate with their moods. To explore this, each couple's individual illness perceptions (except for their belief in emotional consequences) were combined together to present each couple's dyadic view. The higher their combined score was, the stronger illness perception they held. Table 11.22 presents the significant correlations of the combined illness perceptions with the couples' moods (Appendix E-18).

Table 11. 22. Significant correlations between the 35 MI couples' combined illness perceptions and their individual moods at three assessments

	Patients' moods during hospitalisation			Patients' moods at 4-8 weeks post-MI			Patients' moods at 6-month post-MI			
Combined illness perceptions at each time	Depression	anxiety	Negative affect	Depression	anxiety	Negative affect	Depression	anxiety	Positive affect	Negative affect
Causal component 1: Stress causes								0.449**		0.470**
Consequence 1: Physical	0.485**		0.436**	0.593***		0.539***				
Timeline		0.495**				0.515***		0.479**		
Symptom perception	0.646***	0.526***	0.468**	0.665***		0.585***	0.542***		-0.430**	
	Spouses' moods during patients' hospitalisation			Spouses' moods at 4-8 weeks post-MI			Spouses' moods at 6-month post-MI			
Combined illness perceptions at each time	Depression	anxiety	Negative affect	Depression	anxiety	Negative affect		anxiety	Positive affect	Negative affect
Causal component 1: Stress causes	0.565***	0.467**	0.446**	0.428**	0.480**					
Consequence 1: Physical	0.515**									0.505**
Control 1: Active									0.468**	

*** $p \leq 0.001$; ** $p \leq 0.01$

Overall, the combined negative illness perception components correlated with the patients' negative moods at each assessment. The stronger the couples believed in physical consequences and reported more symptoms, the higher levels of depression, state anxiety or negative affect the patients reported. In addition, the combined stress causal attribution positively correlated with spouses' negative moods at the first two assessments and with the patients' negative moods at 6 months post-MI. Furthermore, the combined illness timeline positively correlated with patients' state anxiety during the patients' hospitalisation and at six months later.

Although the couples' combined physical consequence perception only significantly correlated with the spouses' in-hospital depression, its correlation with the spouses' 6-month depression was significant as well. At 6 months post-MI, the couples' combined 'active control' showed a positive correlation with the spouses' positive affect.

Section 11.4 examines the relationships between the MI couples' illness perceptions and moods. Surprisingly, the couples' moods were independent from each other. During the patients' hospitalisation, the MI couples tended to agree on the same types of illness perceptions, but their strength of agreement gradually disappeared over time. In terms of illness perceptions with moods, both the couples' negative illness perceptions tended to correlate with their own negative moods. Although few of the couples' own illness perceptions did correlate with the other's moods, it still reflected the finding that 'negative perceptions positively correlated with negative moods'.

11.5. Will first-time MI couples' perceived social support and coping strategies influence moods?

11.5.1. Correlations between first-time MI couples' social support and moods

None of the patients' moods significantly correlated with any types and sources of their perceived social support and marital satisfaction. The only significant correlation between the spouses' moods and social support were that at time 2, the spouses' positive affect positively correlated with their 'total perceived support' ($r = 0.466$, $p = 0.005$) and 'special one's support' ($r = 0.451$, $p = 0.007$). The more support they perceived in total and from a special one, the stronger positive affect the spouses had (Appendix E-19).

11.5.2. Correlations between first-time MI couples' coping strategies and moods

Table 11.23 lists significant correlations of the 35 couples' moods and their individual coping strategies at the two follow-up assessments (Appendix E-20).

Table 11. 23. Significant correlations between the 35 MI couples' moods and coping strategies at the second and the third assessment

	Time 2: Patients' moods at 4-8 weeks post-MI				Time 3: Patients' moods at 6-month post-MI				
Patients' coping at time 2	Depression	State anxiety	Positive affect	Negative affect	**Patients' coping at time 3**	Depression	State anxiety	Positive affect	Negative affect
					Venting	0.473**			
Self-blame	0.437**				Self-blame	0.499**	0.503**,		0.508**,
Spouses' coping at time 2									
Substance abuse			0.510**						
Humour		0.545***							
	Time 2: Spouses' moods at 4-8 weeks post-MI				Time 3: Spouses' moods at 6-month post-MI				
Spouses' coping at time 2	Depression	State anxiety	Positive affect	Negative affect	**Spouses' coping at time 3**	Depression	State anxiety	Positive affect	Negative affect
Active coping			0.556***						
Denial	0.653***	0.538***		0.694***	Denial	0.453**			
Substance abuse	0.445**								
Behavioural disengagement	0.542***								
					Positive reframing			0.551***	
					Self-distraction	0.684***	0.634***		0.638***
					Venting	0.593***	0.495**		0.618***
Accepting instrumental support			0.477**						
Acceptance			0.604***						
Self-blame	0.636***	0.463*8		0.643***	Self-blame	0.507**			0.430**
Planning	0.444**	0.474**		0.492**					
Patients' coping at time 2					**Patients' coping at time 3**				
Accepting instrumental support	0.435**			0.444**					
					Accepting emotional support		0.449**		
					Self-distraction		0.509**		

** $p \leq 0.01$; *** $p \leq 0.001$

The MI patients' negative moods only correlated with two of their coping strategies. At time 2, only 'self-blame' coping positively correlated with the patients' depression and at time 3, only 'venting' and 'self-blame' positively correlated with the patients' negative moods. It was also found that at time 2, the more often the spouses used 'humour' to cope, the more nervous the patients were, and the more often the spouses used 'substance abuse' to cope, the stronger positive affect the patients reported.

Many of the spouses' coping strategies correlated significantly with their own moods. For example, 'self-blame' coping, 'denial' also positively correlated with the spouses' depression and/or negative affect at time 2 and time 3. Other coping strategies such as 'self-distraction' and 'venting' were positively correlated with the spouses' depression, state anxiety and negative affect at time 3.

Another finding was that 'active coping', 'accepting instrumental support', and 'acceptance' all positively correlated with the spouses' positive affect at time 2 and 'positive reframing' was positively correlated with the spouses' positive affect at time 3. However, the spouses' 'planning' coping positively correlated with their negative moods at time 2.

In summary, none of the MI patients' perceived support correlated with their moods, but the spouses' positive affect was stronger if they perceived more total support or special ones' support at time 2. In terms of moods and coping, it was found that the patients' coping did not really correlate with their moods, except for 'self-blame' and 'venting'. However, findings from the spouses' data suggested that the more maladaptive coping strategies the spouses used, the more negative moods they experienced.

11.6. Will the similarity of first-time MI couples' illness perceptions influence their moods during the first six months post-MI?

Section 10.5 has examined whether the MI couples' differences in illness perceptions would distinguish their moods. This section continues to update long-term examinations. As explained earlier, due to the small sample size, these couples were divided into three groups by their individual median score – (G2): 'patient's score ≥ median & spouse's score ≥ median'; (G1): 'patient's score ≥ median, spouse's score < median' or 'patient's score < median, spouse's score ≥ median'; (G0): 'patient's score < median & spouse's score < median'.

The full cross-sectional information is attached at Appendix E-21 to E-23 and significant results are presented at Table 11.24 to Table 11.26. Longitudinal information is attached in Appendix E-24 & E-25. In addition, the results from another method using "patient – spouse > 0, = 0, or < 0" are attached at Appendix E-26 to E-30.

Table 11. 24. Significant comparison results of in-hospital moods between the three couple groups (based on in-hospital illness perception median split)

Couples' illness perception similarity in –	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	**Spouse' moods mean (SD)**	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI, p)
Causal component 1: stress	Depression	12.73 (7.16) (n = 11)	15.20 (10.13) (n = 10)	17.07 (10.85) (n = 14)	$F_{(2, 32)} = 0.627$, p = 0.540	Causal component 1: stress	depression	18.82 (13.47) (n = 11)	20.00 (10.84) (n = 10)	34.43 (9.32) (n = 14)	**$F_{(2, 32)} = 7.635$, p = 0.002 G2 – G1 = 14.429 (0.29 – 28.57), p = 0.009**
	State anxiety	33.64 (10.05)	31.33 (10.56)	34.52 (14.36)	$F_{(2, 32)} = 0.207$, p = 0.814		State anxiety	41.21 (11.08)	41.33 (14.76)	61.67 (17.63)	**$F_{(2, 32)} = 7.737$, p = 0.002 G2 – G0 = 20.45 (1.73 – 39.18), p = 0.005,**
	Positive affect	26.55 (7.79)	27.80 (7.18)	29.14 (8.09)	$F_{(2, 32)} = 0.349$, p = 0.708		Positive affect	27.27 (5.88)	32.80 (10.88)	28.93 (6.49)	$F_{(2, 32)} = 1.373$, p = 0.268
	Negative affect	18.36 (6.04)	20.50 (13.41)	21.07 (9.43)	$F_{(2, 32)} = 0.244$, p = 0.785		Negative affect	24.00 (9.64)	25.90 (6.08)	31.86 (8.57)	$F_{(2, 32)} = 3.064$, p = 0.061
Consequence component 1: Physical consequences	Depression	11.00 (3.74) (n = 6)	14.39 (10.29) (n = 18)	18.73 (9.78) (n = 11)	$F_{(2, 32)} = 1.441$, p = 0.252	Consequence component 1: Physical consequences	Depression	10.67 (6.12) (n = 6)	23.28 (11.80) (n = 18)	36.91 (7.18) (n =- 11)	**$F_{(2, 32)} = 14.805$, p < 0.001 G2 – G0 = 26.24 (14.44 – 38.05), p < 0.001 G2 – G1 = 13.63 (2.43 – 24.83), p = 0.002 G1 – G0 = 12.61 (0.10 – 25.12), p = 0.009**
	State anxiety	26.67 (6.67)	35.00 (13.10)	34.24 (11.36)	$F_{(2, 32)} = 1.177$, p = 0.321		State anxiety	38.89 (15.44)	44.81 (15.81)	62.73 (15.12)	**$F_{(2, 32)} = 6.282$, p = 0.005 No significant post hoc**
	Positive affect	20.50 (5.01)	28.72 (7.20)	30.73 (7.25)	$F_{(2, 32)} = 4.472$, p = 0.019		Positive affect	31.00 (6.84)	28.89 (9.00)	29.73 (7.03)	$F_{(2, 32)} = 0.158$, p = 0.855
	Negative affect	12.83 (1.72)	20.11 (10.78)	23.91 (8.48)	$F_{(2, 32)} = 2.813$, p = 0.075		Negative affect	18.50 (5.54)	26.94 (7.44)	33.91 (7.79)	**$F_{(2, 32)} = 8.861$, p = 0.001 G2 – G0 = 15.41 (4.07 – 26.75), p = 0.001**
Symptom perception	Depression	10.56 (8.11) (n = 9)	12.38 (6.38) (n = 16)	23.80 (9.91) (n = 10)	**$F_{(2, 32)} = 8.409$, p = 0.001 (but no significant post hoc)**	Symptom perception	Depression	29.56 (14.88) (n = 9)	25.00 (13.62) (n = 16)	22.30 (11.07) (n = 10)	$F_{(2, 32)} = 0.719$, p = 0.495
	State anxiety	29.63 (8.41)	30.00 (8.94)	42.00 (14.67)	$F_{(2, 32)} = 4.547$, p = 0.018		State anxiety	60.00 (17.16)	45.83 (16.80)	45.67 (17.57)	$F_{(2, 32)} = 2.313$, p = 0.115
	Positive affect	30.11 (9.48)	27.13 (7.27)	27.30 (6.62)	$F_{(2, 32)} = 0.480$, p = 0.623		Positive affect	26.22 (7.66)	29.69 (7.60)	32.20 (8.31)	$F_{(2, 32)} = 1.391$, p = 0.263
	Negative affect	17.33 (7.71)	16.81 (7.36)	27.70 (10.95)	**$F_{(2, 32)} = 5.540$, p = 0.009 (but no significant post hoc)**		Negative affect	30.56 (10.47)	27.38 (9.27)	25.60 (6.31)	$F_{(2, 32)} = 0.755$, p = 0.478

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Table 11. 25. Comparisons of time two moods between the three couple groups (based on time-2 illness perception median split)

Couples' illness perception similarity in -	Patient mood Mean (SD)	G0 Both disagree	G1 Dissimilar	G2 Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0 Both disagree	G1 Dissimilar	G2 Both agree	F/ Post hoc results (99% CI, p)
Causal component 1: Stress causes	Depression	8.08 (5.21) (n = 12)	13.11 (8.81) (n = 9)	15.869 (9.32) (n = 14)	$F_{(2, 32)} = 3.085$, p = 0.060	Causal component 1: Stress causes	depression	13.33 (13.94) (n = 12)	14.11 (10.74) (n = 9)	27.93 (14.72) (n = 14)	$F_{(2, 32)} = 4.662$, p = 0.017
	State anxiety	26.67 (7.39)	36.30 (16.87)	37.38 (11.71)	$F_{(2, 32)} = 2.890$, p = 0.070		State anxiety	40.00 (15.76)	39.63 (15.59)	57.86 (15.99)	**$F_{(2, 32)} = 5.453$, p = 0.009 (but no significant post hoc)**
	Positive affect	26.08 (9.63)	27.56 (9.14)	32.00 (6.31)	$F_{(2, 32)} = 1.782$, p = 0.185		Positive affect	28.17 (9.30)	31.56 (5.62)	29.14 (7.47)	$F_{(2, 32)} = 0.506$, p = 0.608
	Negative affect	13.83 (3.71)	16.78 (6.98)	19.64 (6.77)	$F_{(2, 32)} = 3.074$, p = 0.060		Negative affect	18.92 (10.77)	15.44 (6.48)	28.21 (11.07)	**$F_{(2, 32)} = 5.184$, p = 0.010 G2 – G1 = 12.77 (0.81 – 24.73), p = 0.006,**
Symptom perception	Depression	8.92 (6.64) (n = 12)	6.75 (4.06) (n = 8)	18.40 (8.03) (n = 15)	**$F_{(2, 32)} = 10.006$, p < 0.001 G2 – G0 = 9.48 (0.44 – 18.53), p = 0.007 G2 – G1 = 11.65 (3.42 – 19.88), p < 0.001**	Symptom perception	Depression	11.75 (8.07) (n = 12)	29.88 (20.00) (n = 8)	19.87 (13.33) (n = 15)	$F_{(2, 32)} = 4.220$, p = 0.024
	State anxiety	30.28 (13.89)	25.42 (6.41)	40.22 (11.23)	$F_{(2, 32)} = 5.078$, p = 0.012		State anxiety	42.78 (14.62)	55.42 (24.68)	46.00 (15.39)	$F_{(2, 32)} = 1.282$, p = 0.291
	Positive affect	29.58 (9.41)	27.75 (11.39)	28.80 (6.30)	$F_{(2, 32)} = 0.106$, p = 0.900		Positive affect	29.25 (8.19)	26.50 (8.62)	31.13 (6.65)	$F_{(2, 32)} = 0.959$, p = 0.394
	Negative affect	15.17 (5.06)	11.63 (1.77)	21.13 (6.12)	**$F_{(2, 32)} = 10.202$, p < 0.001 G2 – G1 = 9.51 (3.85 – 15.16), p < 0.001**		Negative affect	17.83 (8.81)	28.25 (15.04)	21.40 (9.58)	$F_{(2, 32)} = 2.252$, p = 0.122

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Table 11. 26. Comparisons of time three moods between the three couple groups (based on time-3 illness perception median split)

Couples' illness perception similarity in –	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI, p)
Causal component 3: Unhealthy lifestyle cause	Depression	10.67 (8.78) (n = 12)	6.00 (4.14) (n = 8)	14.00 (7.42) (n = 15)	$F_{(2, 32)} = 3.095$, p = 0.059	Causal component 3: Unhealthy lifestyle cause	Depression	9.25 (7.42) (n = 12)	25.13 (15.70) (n = 8)	15.93 (12.82) (n = 15)	$F_{(2, 32)} = 4.182$, p = 0.024
	State anxiety	33.06 (9.15)	27.08 (8.05)	36.44 (12.75)	$F_{(2, 32)} = 2.003$, p = 0.151		State anxiety	36.11 (13.24)	54.17 (19.66)	42.89 (13.27)	$F_{(2, 32)} = 3.531$, p = 0.041
	Positive affect	32.25 (6.90)	27.50 (10.70)	29.87 (7.19)	$F_{(2, 32)} = 0.861$, p = 0.432		Positive affect	34.83 (8.21)	26.38 (7.13)	31.60 (10.64)	$F_{(2, 32)} = 2.049$, p = 0.145
	Negative affect	15.25 (7.06)	15.25 (7.67)	16.07 (6.05)	$F_{(2, 32)} = 0.062$, p = 0.940		Negative affect	13.25 (4.45)	27.63 (13.99)	18.07 (6.92)	**$F_{(2, 32)} = 7.078$, p = 0.003 (but not significant post hoc)**
Control component 1: Active control	Depression	10.89 (9.32) (n = 9)	10.75 (8.55) (n = 12)	11.36 (6.64) (n = 14)	$F_{(2, 32)} = 0.020$, p = 0.980	Control component 1: Active control	depression	23.44 (10.58) (n = 9)	12.42 (13.93) (n = 12)	13.64 (12.67) (n = 14)	$F_{(2, 32)} = 2.279$, p = 0.119
	State anxiety	33.70 (12.85)	30.83 (9.65)	34.76 (11.30)	$F_{(2, 32)} = 0.413$, p = 0.665		State anxiety	54.07 (14.60)	37.22 (16.44)	41.19 (13.69)	$F_{(2, 32)} = 3.484$, p = 0.043
	Positive affect	24.67 (9.17)	30.17 (6.51)	33.64 (6.69)	$F_{(2, 32)} = 4.109$, p = 0.026		Positive affect	22.22 (6.63)	33.67 (9.12)	35.64 (7.28)	**$F_{(2, 32)} = 8.766$, p = 0.001 G2 – G0 = 13.42 (3.66 – 23.18), p = 0.001 G1 – G0 = 11.44 (0.10 – 22.79), p = 0.009**
	Negative affect	15.67 (7.53)	15.08 (5.62)	16.00 (7.19)	$F_{(2, 32)} = 0.060$, p = 0.942		Negative affect	23.00 (8.72)	16.50 (10.36)	17.57 (9.72)	$F_{(2, 32)} = 1.283$, p = 0.291

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Results from the above tables are as follows:
From time 1 to time 3, the dissimilarity of the MI couples' symptom perception was the only perception which distinguished the patients' depression and negative affect at time 1 and time 2. Although there was no significant post-hoc comparison at time 1, post-hoc comparison at time 2 indicated if both couples reported more perceived/observed symptoms, then the patients tended to had higher depression and negative affect than the patients from the other two groups.

During patients' hospitalisation, the couples' differences in stress attribution and physical consequence perception both distinguished the spouses' depression and state anxiety. When the couples both had high agreement on stress causes or physical consequences, these spouses reported higher levels of anxiety and depression than other spouses did. In addition, when the MI couples both agreed on serious physical consequences, these spouses tended to have a stronger negative affect than other the spouses.

At time 2, only the couples' differences on stress causes could distinguish the spouses' state anxiety and negative affect. Although there was no significant post-hoc comparison on state anxiety, the spouses from the group that both couples highly agreed on stress causes tended to have a significantly higher negative affect than the other spouses did.

At time 3, although none of the couples' illness perception differences could distinguish the patients' moods, the couples' differences in unhealthy lifestyles attribution distinguished the spouses' negative affect. Table 11.26 showed that when the couples disagreed on unhealthy lifestyles as potential MI causes, the spouses from this group tended to report higher negative affect than the other spouses did.

Finally, when both couples agreed on active control, the spouses from this group tended to have higher positive affect than the other spouses did. In addition, the spouses from the group that both couples disagreed on active control reported lower positive affect than those spouses who disagreed with the patients on this perception. This indicated that as long as one of the couples believed in active control, their spouses would have a higher level of positive affect.

Hypothesis testing

H17: Those couples who both believe that an MI will bring the patients serious consequences will be more depressed and anxious than those couples who do not believe so.

As emotional consequence perception focused on the patients' and the spouses' individual emotional consequence perception, this perception component was not used to compare couples' differences.

The results from the above section showed that during the patients' hospitalisation, those spouses who were in the group where both couples thought the MI would bring the patients serious physical consequences reported higher levels of depression, state anxiety and negative affect than the other spouses did.

However, the same result did not apply to the MI patients. In addition, at time 2 and time 3, those couples who both believed in serious physical consequences did not show higher levels of depression and state anxiety than the couples who either both disagreed at this perception or held different opinions. Therefore, the current results could only partially support this hypothesis.

11.7. Will first-time MI couples contribute to each other's moods over time – A multivariate Approach

To examine whether MI couples would contribute to each other's moods, this section presents regression models of the 35 MI couples' moods at each assessment. Baseline variables were also used to predict couples' moods at 6-month post-MI.

11.7.1. Depression

11.7.1.1. Depression at each assessment

Table 11.27 to Table 11.29 display the 35 couples' depression at each assessment.

Table 11. 27. Regression results of the 35 MI couples' depression during the patients' hospitalisation

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' depression during hospitalisation					
Block 1			0.380	0.361	
Patients' in-hospital symptom perception	0.203	1.253			
Block 2			0.615	0.563	20.2**
Patients' in-hospital 'physical consequences' perception	0.339	2.075*			
Patients' in-hospital 'emotional consequences' perception	-0.081	-0.585			
Patients' in-hospital 'passive control' perception	0.076	0.421			
Block 3			0.673	0.617	5.4*
Patients' in-hospital state anxiety	0.312	2.073*			
Block 4			0.677	0.607	-1.0
Couples' in-hospital difference in 'passive control' perception	0.083	0.488			
Block 5			0.695	0.616	0.9
Spouses' observed symptom perception during patients' hospitalisation	0.193	1.272			
F (7, 27) = 8.787, p < 0.001					
Predictors of spouses' depression during patients' hospitalisation					
Block 1			0.205	0.181	
Spouses' age	-0.048	-0.400			
Block 2			0.615	0.591	41.0***
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.412	2.565*			
Block 3			0.697	0.668	7.7**
Spouses' state anxiety during patients' hospitalisation	0.414	3.266**			
Block 4			0.733	0.687	1.9
Spouses' 'stress' causal perception during patients' hospitalisation	-0.083	-0.594			
Spouses' 'physical consequences' perception during patients' hospitalisation	0.265	1.930			
Block 5			0.733	0.675	-0.12
Patients' in-hospital 'stress' causal perception	0.003	0.024			
F (6, 28) = 12.791, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 28. Regression results of the 35 MI couples' depression at 4-8 weeks post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' depression at 4-8 weeks post-MI					
Block 1			0.366	0.347	
Patients' symptom perception at 4-8 weeks post-MI	0.026	0.153			
Block 2			0.504	0.438	9.1
Patients' 'stress' causal perception at 4-8 weeks post-MI	-0.179	-0.980			
Patients' 'physical consequences' perception at 4-8 weeks post-MI	0.090	0.453			
Patients' 'emotional consequences' perception at 4-8 weeks post-MI	0.168	0.839			
Block 3			0.521	0.439	0.1
Patients' 'self-blame' coping at 4-8 weeks post-MI	0.186	1.310			
Block 4			0.631	0.552	11.3**
Patients' state anxiety at 4-8 weeks post-MI	0.435	3.135**			
Block 5			0.635	0.540	-1.2
Couples' difference in 'stress' causal perception at 4-8 weeks post-MI	0.037	0.235			
Block 6			0.688	0.592	5.2*
Spouses' observed symptom perception at 4-8 weeks post-MI	0.347	2.107*			
F (8, 26) = 7.163, p < 0.001					
Predictors of spouses' depression at 4-8 weeks post-MI					
Block 1			0.491	0.475	
Spouses' 'emotional consequences' perception at 4-8 weeks post-MI	0.193	1.533			
Block 2			0.776	0.728	25.3
Spouses' 'denial' coping at 4-8 weeks post-MI	0.058	0.509			
Spouses' 'substance abuse' coping at 4-8 weeks post-MI	0.076	0.822			
Spouses' 'behaviour disengagement' coping at 4-8 weeks post-MI	0.192	1.982			
Spouses' 'self-blame' coping at 4-8 weeks post-MI	0.289	2.777**			
Spouses' 'planning' coping at 4-8 weeks post-MI	-0.133	-1.289			
Block 3			0.814	0.766	3.8*
Spouses' state anxiety at 4-8 weeks post-MI	0.356	2.939***			
Block 4			0.838	0.788	2.2
Spouses' 'physical consequences' perception at 4-8 weeks post-MI	0.193	1.916			
Block 5			0.853	0.800	1.2
Patients' 'accepting instrumental support' coping at 4-8 weeks post-MI	0.146	1.629			
F (9, 25) = 116.146, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 29. Regression results of the 35 MI couples' depression at 6-month post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' depression at 6 months post-MI					
Block 1			0.253	0.230	
Patients' 'symptom perception' at 6 months post-MI	0.120	0.659			
Block 2			0.383	0.324	9.4
Patients' 'emotional consequences' perception at 6 months post-MI	0.094	0.516			
Patients' 'future MI threat' at 6 months post-MI	0.049	0.328			
Block 3			0.483	0.394	7.0
Patients' 'venting' coping at 6 months post-MI	0.165	1.196			
Patients' 'self-blame' coping at 6 months post-MI	0.060	0.383			
Block 4			0.629	0.549	15.5**
Patients' state anxiety at 6 months post-MI	0.474	3.308**			
Block 5			0.639	0.546	-0.03
Spouses' observed symptom perception at 6 months post-MI	0.133	0.882			
F (7, 27) = 6.834, p < 0.001					
Spouses --					
Block 1			0.247	0.224	
Spouses' 'emotional consequences' at 6 months post-MI	0.060	0.491			
Block 2			0.606	0.539	31.5***
Spouses' 'denial' coping at 6 months post-MI	0.144	1.279			
Spouses' 'self-distraction' coping at 6 months post-MI	0.245	1.593			
Spouses' 'venting' coping at 6 months post-MI	0.041	0.279			
Spouses' 'self-blame' coping at 6 months post-MI	0.119	1.101			
Block 3			0.791	0.737	19.8***
Spouses' state anxiety at 6 months post-MI	0.362	2.327*			
Spouses' positive affect at 6 months post-MI	-0.245	-2.287*			
Block 4			0.799	0.737	0.0
Spouses' observed symptom perception at 6 months post-MI	0.103	0.994			
F (8, 26) = 12.897, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

MI patients' depression from time 1 to time 3

Overall, the patients' illness perceptions explained at least 32% of the variance of their depression at each assessment. However, the contribution of illness perceptions decreased over time. This indicated that when the MI just happened, these patients mainly concentrated on their illness perceptions. As time passed, other aspects, not just illness perceptions, were taken into account to deal with depression (e.g., coping); therefore, the contribution of illness perceptions would decrease.

'State anxiety' was the only predictor showing a persistently important role in explaining the patients' depression. In fact, when illness perception components, coping and other mood variables entered into the regression together, the patients' state anxiety played a more important role than their illness perceptions.

Although the spouses observed symptoms always significantly correlated with the patients' depression, it was only important at the second assessment. The couples' perception differences were not significant in explaining the patients' depression.

MI spouses' depression from time 1 to time 3

The spouses' emotional consequence perception was the only illness perception component that was continuously included in the regression models from time 1 to time 3. Although the spouses' emotional consequence perception was not a significant predictor for the final regression model, when it was entered first in the regression models, it could explain around 22.4% to 47.5% of the spouses' depression during the patients' hospitalisation. Overall, no particular illness perceptions significantly contributed to the spouses' depression.

The spouses' state anxiety was the only significant predictor of their depression over the first six months. The predictors that were related to the patients and the couples' illness perception differences did not significantly predict the spouses' depression.

As coping strategies were not measured during the patients' hospitalisation, it was impossible to examine their influences. However, 'self-blame' coping was related to the spouses' depression and this was particularly obvious at the second assessment.

These regressions showed that the couples' illness perceptions were important in explaining their depression. However, state anxiety seemed to play a more important role in both couples' depression.

11.7.1.2. Predicting depression at 6 months post-MI

Table 11.30 presents the regression results of the 35 couples' depression at 6-month post-MI. The in-hospital variables were used as predictors.

Table 11. 30. Regression results in predicting the 35 MI couples' depression at 6-month post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' 6-month depression – without controlling in-hospital depression					
Block 1			0.272	0.227	
Patients' in-hospital 'physical consequences' perception	0.232	1.240			
Patients' in-hospital 'emotional consequences' perception	0.187	0.983			
Block 2			00.338	0.274	4.7
Patients' in-hospital state anxiety	0.296	1.756			
F (3, 31) = 5.274, p = 0.005					
Predictors of patients' 6-month depression – controlling in-hospital depression					
Block 1			0.221	0.197	
Patients' in-hospital depression	0.099	0.420			
Block 2			0.311	0.244	4.7
Patients' in-hospital 'physical consequences' perception	0.185	0.844			
Patients' in-hospital 'emotional consequences' perception	0.193	1.000			
Block 3			0.342	0.254	1.0
Patients' in-hospital state anxiety	0.247	1.187			
F (4, 30) = 3.894, p = 0.012					
Predictors of spouses' 6-month depression – without controlling depression during patients' hospitalisation					
Block 1			0.248	0.225	
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.383	2.504*			
Block 2			0.341	0.300	7.5*
Couples' illness perception difference in in-hospital 'external' causal component	-0.327	-2.134*			
F (2, 32) = 8.291, p < 0.001					
Predictors of spouses' 6-month depression – controlling depression during patients' hospitalisation					
Block 1			0.363	0.344	
Spouses' depression during patients' hospitalisation	0.477	2.207*			
Block 2			0.366	0.326	1.8
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.033	0.152			
Block 3			0.431	0.376	5.0
Couples' illness perception difference in in-hospital 'external' causal component	-0.276	-1.884			
F (3, 31) = 7.820, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

None of the patients' illness perceptions or other mood variables significantly predicted the patients' 6-month depression. When the spouses' baseline depression was controlled for, none of the other predictors was significant. When the spouses' baseline depression was not controlled first, the spouses' 'emotional consequences' perception and the couples' perception difference in 'external' causal component became significant. Overall, only around 25% of the patients' depression and 30% of the spouses' depression could be predicted from the baseline predictors, respectively.

11.7.2. State anxiety

11.7.2.1. State anxiety at each assessment

Table 11.31 to 11.33 present the couples' anxiety at each assessment.

Table 11. 31. Regression results of 35 MI couples' anxiety during patients' hospitalisation

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' in-hospital state anxiety					
Block 1			0.343	0.323	
Patients' in-hospital 'symptom perception'	0.300	1.987			
Block 2			0.587	0.532	20.9**
patients' in-hospital 'physical consequences' perception	0.036	0.204			
Patients' 'in-hospital 'emotional consequences' perception	0.135	0.902			
Patients' in-hospital 'timeline' perception	0.329	2.605*			
Block 3			0.617	0.551	1.9
Patients' in-hospital depression	0.296	1.511			
F (5, 29) = 9.335, p < 0.001					
Predictors of spouses' state anxiety during patients' hospitalisation					
Block 1			0.341	0.321	
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.168	0.873			
Block 2			0.560	0.517	19.6**
Spouses' depression during patients' hospitalisation	0.314	1.567			
Spouses' positive affect during patients' hospitalisation	-0.259	-2.047*			
Block 3			0.617	0.550	3.3
Spouses' 'stress' causal component during patients' hospitalisation	0.192	1.359			
Spouses' 'external' causal component during patients' hospitalisation	0.221	1.706			
F (5, 29) = 9.326, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 32. Regression results of the 35 MI couples' anxiety at 4-8 weeks post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' state anxiety at 4-8 weeks post-MI					
Block 1			0.189	0.164	
Patients' symptom perception at 4-8 weeks post-MI	-0.125	-0.730			
Block 2			0.324	0.234	7.0
Patients' 'stress' causal perception at 4-8 weeks post-MI	0.036	0.200			
Patients' 'physical consequences' perception at 4-8 weeks post-MI	0.129	0.633			
Patients' 'emotional consequences' perception at 4-8 weeks post-MI	-0.019	-0.090			
Block 3			0.467	0.375	14.1**
Patients' depression at 4-8 weeks post-MI	0.447	2.566*			
Block 4			0.483	0.372	-0.3
Couples' illness perception difference in 'stress' causal component	0.191	1.136			
Block 5			0.610	0.509	13.7**
Spouses' humour coping at 4-8 weeks post-MI	0.380	2.975**			
F (7, 27) = 6.045, p < 0.001					
Predictors of spouses' state anxiety at 4-8 weeks post-MI					
Block 1			0.385	0.366	
Spouses' 'emotional consequences' perception at 4-8 weeks post-MI	0.137	0.931			
Block 2			0.486	0.417	5.1
Spouses' denial coping at 4-8 weeks post-MI	0.067	0.538			
Spouses' self-blame coping at 4-8 weeks post-MI	-0.082	-0.642			
Spouses' planning coping at 4-8 weeks post-MI	0.255	2.142*			
Block 3			0.768	0.719	30.2***
Spouses' depression at 4-8 weeks post-MI	0.408	2.309*			
Spouses' positive affect at 4-8 weeks post-MI	-0.445	-4.464***			
Block 4			0.782	0.726	0.7
Patients' 'stress' causal component at 4-8 weeks post-MI	0.139	1.313			
F (7, 27) = 13.854, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 33. Regression results of the 35 MI couples' anxiety at 6-month post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' state anxiety at 6 months post-MI					
Block 1			0.303	0.259	
Patients' 'stress' causal perception at 6 months post-MI	0.324	2.137*			
Patients' 'emotional consequences' perception at 6 months post-MI	-0.120	-0.723			
Block 2			0.345	0.282	4.2
Patients' self-blame coping at 6 months post-MI	0.080	0.511			
Block 3			0.584	0.529	23.9***
Patients' depression at 6 months post-MI	0.623	4.153***			
F (4, 30) = 10.547, p < 0.001					
Spouses --					
Block 1			0.391	0.372	
Spouses' 'emotional consequences' perception at 6 months post-MI	0.294	3.070**			
Block 2			0.583	0.542	17.0**
Spouses' self-distraction coping at 6 months post-MI	0.238	1.706			
Spouses' venting coping at 6 months post-MI	-0.007	-0.060			
Block 3			0.820	0.788	24.6***
Spouses' depression at 6 months post-MI	0.439	3.048**			
Spouses' positive affect at 6 months post-MI	-0.232	-2.281*			
F (5, 28) = 25.546, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

MI patients' anxiety from time 1 to time 3

During hospitalisation, the patients' timeline perception was the only significant predictor of their state anxiety. In general, their illness perceptions explained over 53% of anxiety at time 1 and over 23% of anxiety at assessment 2 and 3.

Although the patients' in-hospital depression was not a significant predictor, their depression at time 2 and time 3 was a significant predictor of their state anxiety at the same time. In addition, the spouses' 'humour coping' was also a strong predictor of the patients' anxiety at 4-8 week post-MI. It seemed that the more often the spouses used humour to face the stressful event (MI), the more anxious the patients were. Another finding was that at 6-month post-MI, the patients' stress causal perception became a significant predictor of the patients' anxiety at 6-month post-MI. As one recalled that 'stress' causal perception significantly correlated with the patients' negative moods at both two follow-up assessments, but not at the patients' hospitalisation, it was possible that the patients who attributed 'stress' as a possible cause at time 3 also tended to feel anxious.

MI spouses' anxiety from time 1 to time 3

The spouses' positive affect was the only consistent predictor from time 1 to time 3. The spouses' depression was a significant predictor of their state anxiety at the second and

third assessment. In addition, the spouses' 'planning coping' at time 2 and 'emotional consequences' perception at time 3 also contributed significantly to time 2 and time 3 anxiety, respectively.

Although except for the 6-month 'emotional consequences' perception, none of the spouses' other illness perceptions significantly predicted their state anxiety, the spouses' illness perceptions still contributed over 36% of the variance to their anxiety at each assessment.

11.7.2.2. Predicting state anxiety at 6 months post-MI

Table 11.34 presents the prediction of the 35 couples' state anxiety at 6 months post-MI.

Table 11. 34. Regression results in predicting 35 MI couples' anxiety at 6-month post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' state anxiety at 6 months post-MI –without controlling in-hospital state anxiety					
Block 1			0.191	0.166	
Patients' in-hospital 'emotional consequences' perception	0.267	1.490			
Block 2			0.263	0.217	5.1
Patients' in-hospital negative affect	0.317	1.768			
F (2, 32) = 5.698, p = 0.008					
Predictors of patients' state anxiety at 6 months post-MI – controlling baseline state anxiety					
Block 1			0.148	0.122	
Patients' in-hospital state anxiety	0.107	0.533			
Block 2			0.234	0.186	6.4
Patients' in-hospital 'emotional consequences' perception	0.249	1.348			
Block 3			0.269	0.199	1.3
Patients' in-hospital negative affect	0.260	1.230			
F (3, 31) = 3.808, p = 0.020					
Predictors of spouses' state anxiety at 6 months post-MI – without controlling state anxiety during patients' hospitalisation					
Block 1			0.233	0.209	
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.133	0.581			
Block 2			0.295	0.251	4.2
Spouses' depression during patients' hospitalisation	0.330	1.436			
Block 3			0.358	0.296	4.5
Couples' illness perception difference in 'external' causal perception	-0.272	-1.747			
F (3, 31) = 5.760, p < 0.001					
Predictors of spouses' state anxiety at 6 months post-MI – controlling state anxiety during patients' hospitalisation					
Block 1			0.243	0.220	
Spouses' state anxiety during patients' hospitalisation	0.231	1.164			
Block 2			0.300	0.257	3.7
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.102	0.448			
Block 3			0.322	0.256	-0.1
Spouses' depression during patients' hospitalisation	0.194	0.757			
Block 4			0.386	0.304	4.8
Couples' illness perception difference in 'external' causal perception	-0.273	-1.766			
F (4, 30) = 4.709, p < 0.001					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

No matter whether the baseline state anxiety was controlled for, none of the baseline predictor was significant enough to predict the couples' state anxiety at 6-month post-MI. Overall, these variables could only predict about 20% of the patients' state anxiety and 30% of the spouses' state anxiety at 6-month post-MI.

11.7.3. Positive affect

11.7.3.1. Positive affect at each assessment

Table 11.35 to Table 11.37 display the regression results of the couples' positive affect at each assessment.

Table 11. 35. Regression results of the 35 MI couples' positive affect during the patients' hospitalisation

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' in-hospital positive affect					
Block 1			0.278	0.233	
Patients' age	0.047	0.113			
Patients' income	0.321	1.977			
Block 2			0.299	0.231	-0.2
Spouses' age	-0.388	-0.953			
F (3, 31) = 4.407, p = 0.011					
Predictors of spouses' positive affect during patients' hospitalisation					
Block 1			0.211	0.187	
Spouses' state anxiety during patients' hospitalisation	-0.459	-2.970**			
F (1, 33) = 8.821, p = 0.006					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 36. Regression results of the 35 MI couples' positive affect at 4-8 weeks post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' positive affect at 4-8 weeks post-MI					
Block 1			0.232	0.209	
Patients' age	-0.279	-0.718			
Block 2			0.235	0.187	-2.2
Spouses' age	-0.069	-0.176			
Block 3			0.363	0.301	11.4*
Spouses' substance abuse coping at 4-8 weeks post-MI	0.384	2.490*			
F (3, 31) = 5.877, p = 0.003					
Predictors of spouses' positive affect at 4-8 weeks post-MI					
Block 1			0.515	0.432	
Spouses' active coping at 4-8 weeks post-MI	0.261	1.461			
Spouses' 'accepting instrumental support coping at 4-8 weeks post-MI	0.059	0.424			
Spouses' acceptance coping at 4-8 weeks post-MI	0.361	2.577*			
Spouses' perceived total support at 4-8 weeks post-MI	0.078	0.372			
Spouses' perceived special one's support at 4-8 weeks post-MI	0.140	0.774			
Block 2			0.732	0.674	24.2***
Spouses' state anxiety at 4-8 weeks post-MI	-0.451	-4.088***			
Block 3			0.734	0.666	-0.8
Patients' 'external' causal perception at 4-8 weeks post-MI	-0.073	-0.513			
F (7, 27) = 10.665, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 37. Regression results of the 35 MI couples' positive affect at 6-month post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' positive affect at 6 months post-MI					
Block 1			0.244	0.221	
Patients' symptom perception at 6 months post-MI	-0.494	-3.262**			
F (1, 33) = 10.641, p = 0.003					
Predictors of spouses' positive affect at 6 months post-MI					
Block 1			0.303	0.282	
Spouses' positive reframing coping at 6 months post-MI	0.367	2.662*			
Block 2			0.489	0.439	15.7**
Spouses' depression at 6 months post-MI	-0.367	-1.914			
Spouses' state anxiety at 6 months post-MI	0.012	0.062			
Block 3			0.622	0.557	11.8*
Patients' 'active' control perception at 6 months post-MI	0.208	1.437			
Patients' 'passive' control perception at 6 months post-MI	-0.317	-2.720*			
F (5, 29) = 9.555, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

MI patients' positive affect from time 1 to time 3

In general, none of the patients' illness perception components was entered into the regression models at baseline and the second assessment. During the patients' hospitalisation, none of the predictors significantly predicted the patients' positive affect. At 6-month post-MI, the patients' symptom perception was the only significant predictor.

However, at the second assessment, the spouses' 'substance abuse coping' was the only significant predictor of the patients' positive affect. As the couples' moods did not correlate significantly, it was possible that the spouses' use of medicine or other chemical aids may have made the patients worried. Therefore, these patients tried to be more positive to comfort their spouses.

MI spouses' positive affect from time 1 to time 3

During the patients' hospitalisation, the spouses' state anxiety was the only predictor of the spouses' positive affect – the higher anxiety the spouses had, the less positive affect they felt.

At 4-8 week post-MI, the spouses' state anxiety was even more important to their positive affect. At the same time, learning to accept what had happened (acceptance coping) also contributed to the spouses' positive affect. At 6-month post-MI, the spouses' 'positive reframing coping' became significant, as well as the patients' 'passive control' perception. The less the patients believed in 'passive control', the higher level of positive affect the spouses reported at the same time.

11.7.3.2. Predicting positive affect at 6 months post-MI

Table 7.38 presents the regression results of the 35 couples' positive affect at 6 months post-MI.

Table 11. 38. Regression results in predicting the 35 MI couples' positive affect at 6-month post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' positive affect at 6 months post-MI – controlling in-hospital positive affect					
Block 1			0.207	0.183	
Patients' in-hospital positive affect	0.455	2.937**			
F (1, 33) = 8.629, p = 0.006					
Predictors of spouses' positive affect at 6 months post-MI –without controlling in-hospital positive affect					
Block 1			0.275	0.254	
Patients' in-hospital positive affect	0.525	3.542***			
F (1, 33) = 12.548, p = 0.001					
Predictors of spouses' positive affect at 6 months post-MI – controlling positive affect during patients' hospitalisation					
Block 1			0.474	0.458	
Spouses' positive affect during patients' hospitalisation	0.613	5.662***			
Block 2			0.638	0.615	15.7***
Patients' in-hospital positive affect	0.412	3.809***			
F (2, 32) = 28.206, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

As the patients' positive affect at 6 months post-MI only significantly correlated with their baseline positive affect, no other predictor was entered. Therefore, the patients' baseline positive affect was the only significant predictor of their positive affect at 6-month post-MI.

When the spouses' baseline positive affect was controlled for, it became a significant predictor of the spouses' positive affect at 6-month post-MI. In addition, no matter whether the spouses' baseline positive affect was controlled for, the patients' baseline positive affect was a significant predictor of the spouses' positive affect at 6-month post-MI. Although the couples' baseline positive affect did not correlate significantly, this finding implied the patients' positive affect might have a long-term influence on the spouses' positive mood.

11.7.4. Negative affect

11.7.4.1. Negative affect at each assessment

Table 11.39 to 11.41 display regression results of the 35 couples' negative affect from time 1 to time 3.

Table 11. 39. Regression results of the 35 MI couples' negative affect during the patients' hospitalisation

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' in-hospital negative affect					
Block 1			0.321	0.300	
Patients' in-hospital symptom perception	0.283	1.886			
Block 2			0.515	0.468	16.8**
Patients' in-hospital 'physical consequences' perception	0.203	1.238			
Patients' in-hospital 'emotional consequences perception	0.165	1.053			
Block 3			0.562	0.504	3.6
Patients' in-hospital state anxiety	0.231	1.373			
Block 4			0.581	0.508	0.4
Couples' illness perception difference in 'passive' control perception	0.161	1.127			
F (5, 29) = 8.034, p < 0.001					
Predictors of spouses' negative affect during patients' hospitalisation					
Block 1			0.228	0.204	
Spouses' age	-0.193	-1.608			
Block 2			0.559	0.532	32.8***
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.441	3.108**			
Block 3			0.637	0.602	7.0*
Spouses' state anxiety during patients' hospitalisation	0.344	2.578*			
F (3, 31) = 18.132, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Table 11. 40. Regression results of the 35 MI couples' negative affect at 4-8 weeks post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' negative affect at 4-8 weeks post-MI					
Block 1			0.277	0.255	
Patients' symptom perception at 4-8 weeks post-MI	-0.067	-0.365			
Block 2			0.510	0.426	17.1*
Patients' 'stress' causal perception at 4-8 weeks post-MI	-0.020	-0.112			
Patients' 'physical consequences' perception at 4-8 weeks post-MI	0.259	1.279			
Patients' 'emotional consequences' perception at 4-8 weeks post-MI	0.034	0.163			
Patients' 'timeline' perception at 4-8 weeks post-MI	0.066	0.470			
Block 3			0.599	0.513	8.7*
Patients' state anxiety at 4-8 weeks post-MI	0.374	2.478*			
Block 4			0.618	0.519	0.6
Couples' illness perception difference in 'stress' causal perception	0.167	0.986			
Block 5			0.644	0.535	1.6
Spouses' observed symptom perception at 4-8 weeks post-MI	0.242	1.377			
$F(8, 26) = 5.886$, $p < 0.001$					
Predictors of spouses' negative affect at 4-8 weeks post-MI					
Block 1			0.474	0.458	
Spouses' 'emotional consequences' perception at 4-8 weeks post-MI	0.180	1.421			
Block 2			0.729	0.693	23.5***
Spouses' denial coping at 4-8 weeks post-MI	0.276	2.489*			
Spouses' self-blame coping at 4-8 weeks post-MI	0.315	3.053**			
Spouses' planning coping at 4-8 weeks post-MI	-0.097	-0.874			
Block 3			0.790	0.754	6.1**
Spouses' state anxiety at 4-8 weeks post-MI	0.321	2.685*			
Block 4			0.793	0.748	-0.6
Spouses' 'stress' causal perception at 4-8 weeks post-MI	0.071	0.719			
Block 5			0.807	0.757	0.9
Patients' 'accepting instrumental support' coping at 4-8 weeks post-MI	0.136	1.398			
$F(7, 27) = 16.113$, $p < 0.001$					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 11. 41. Regression results of the 35 MI couples' negative affect at 6 months post-MI

	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' negative affect at 6 months post-MI					
Block 1			0.367	0.348	
Patients' 'stress' causal perception at 6 months post-MI	0.414	2.417*			
Block 2			0.411	0.374	2.6
Patients' self-blame coping at 6 months post-MI	0.198	1.157			
Block 3			0.429	0.374	0.0
Patients' state anxiety at 6 months post-MI	0.165	0.995			
$F(3, 31) = 7.775$, $p = 0.001$					
Predictors of spouses' negative affect at 6 months post-MI					
Block 1			0.327	0.307	
Spouses' 'emotional consequences' perception at 6 months post-MI	-0.116	-0.729			
Block 2			0.576	0.519	21.2**
Spouses' self-distraction coping at 6 months post-MI	-0.018	-0.116			
Spouses' venting coping at 6 months post-MI	0.133	0.886			
Spouses' self-blame coping at 6 months post-MI	-0.028	-0.262			
Block 3			0.748	0.705	18.6***
Spouses' state anxiety at 6 months post-MI	0.772	5.198***			
Block 4			0.785	0.739	3.4*
Spouses' 'physical consequences' perception at 6 months post-MI	0.325	2.182*			
$F(6, 28) = 17.016$, $p < 0.001$					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

MI patients' negative affect from time 1 to time 3

None of the predictors at time 1 was significant to the patients' negative affect. At time 2, only the patients' state anxiety was a significant predictor. At the third assessment, only the patients' stress causal attribution was a significant predictor.

Overall, the patients' illness perceptions explained around 34% to 46% of the patients' negative affect across time, but the amount of variance which illness perceptions explained gradually reduced at each assessment. Coping strategy did not contribute significantly to the patients' negative affect.

MI spouses' negative affect from time 1 to time 3

Overall, the spouses' state anxiety played an important role on their negative affect at each assessment. During the patients' hospitalisation, the spouses' 'emotional consequences' perception also contributed significantly. However, it was not significant at the two follow-up assessments. Instead, the spouses' physical consequences' perception was a significant predictor at time 3.

Although a number of coping strategies were entered into the regression models at time 2 and time 3, not all of the individual coping strategies were significant to the spouses' negative affect at both assessments. The results showed only time 2 'denial' and 'self-blame' coping significantly contributed to the spouses' negative affect at the same time, but none of the spouses' coping strategies contributed significantly to their negative affect at time 3.

In summary, mood variables (i.e., state anxiety) seemed to be more important than other variables in predicting the couples' negative affects. Although most of the couples' illness perceptions did not contribute significantly to their individual negative affect, illness perceptions still explained over 34% to 46% of the patients' negative affect, and 30% to 45% of the spouses' when illness perceptions were entered into regression models. However, it was also important to consider that coping strategies could be important in determining negative affect. Although coping did not explain a lot of the patients' negative affect at the second and third assessment, the spouses' coping strategies explained 21% to 23% of their negative affect.

11.7.4.2. Predicting negative affect at 6 months post-MI

Table 11.42 presents the predicting results of the 35 couples' negative affect at 6-month post-MI. As the patients' negative affect at time 3 did not significantly correlate with their baseline negative affect, the patients' baseline negative affect was not controlled.

Table 11. 42. Regression results of the 35 couples' negative affect at 6-month post-MI

Predictor Variable	β	t (35)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Predictors of patients' negative affect at 6-month post-MI– without controlling in-hospital negative affect-					
Block 1			0.204	0.180	
Patients' in-hospital state anxiety	0.423	3.046**			
Block 2			0.387	0.348	16.8**
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.429	3.090**			
F (2, 32) = 10.087, p < 0.001					
Predictors of spouses' negative affect at 6-month post-MI– without controlling negative affect during patients' hospitalisation					
Block 1			0.301	0.280	
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.261	1.667			
Block 2			0.341	0.300	2.0
Spouses' state anxiety during patients' hospitalisation	0.213	1.406			
Block 3			0.532	0.487	18.7***
Couples' illness perception difference in 'external' causes perception	-0.467	-3.551***			
F (3, 31) = 11.741, p < 0.001					
Predictors of spouses' negative affect at 6-month post-MI – with controlling negative affect during patients' hospitalisation					
Block 1			0.342	0.323	
Spouses' negative affect during patients' hospitalisation	0.239	1.216			
Block 2			0.375	0.336	1.3
Spouses' 'emotional consequences' perception during patients' hospitalisation	0.144	0.785			
Block 3			0.385	0.325	-1.1
Spouses' state anxiety during patients' hospitalisation	0.131	0.795			
Block 4			0.554	0.494	16.9**
Couples' illness perception difference in 'external' causal perception	-0.444	-3.375**			
F (4, 30) = 9.312, p < 0.001					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

The regression results indicated that the patients' baseline state anxiety and the spouses' baseline emotional consequence perception both significantly predicted the patients' negative affect at 6 months post-MI.

No matter whether the spouses' baseline negative affect was controlled for, the only significant predictor of the spouses' negative affect at 6 months post-MI was the couples' difference in 'uncontrollable/external' causal perception. If the spouses had a stronger belief in uncontrollable causes than the patients had, then the spouses tended to report a higher level of negative affect at 6 months post-MI.

11.8. Conclusion

This chapter described the 35 first-MI couples who completed three assessments between the patients' hospitalisation to 6 months post-MI. The patients' moods did not change significantly over time, but the spouses' depression and negative affect decreased significantly. Most of the couples' illness perceptions remained unchanged during the first six months. However, both couples gradually believed that the patients' condition might be chronic and its recovery time would be much longer than they originally expected. Most of the MI couples' perceived support and coping remained unchanged. The MI couples' mood did not significantly correlate with each other. However, some of their illness perceptions did correlate. It also showed that the MI couples' own illness perceptions mainly contributed to their own moods, but not to their partners' moods.

CHAPTER TWELVE – DISCUSSION

This chapter commences with a summary of findings, followed by discussions and comparisons with past studies. In addition, clinical implications, strengths and limitations of the current study and recommendations for future research are presented.

12.1. What are first-time MI patients' emotional responses during the first six months?

12.1.1. The finding summary

While staying in hospital, the MI patients reported higher levels of depressive symptoms, state anxiety and negative affect if compared with healthy people. Almost half of the patients scored more than 16 on the CESD depression scale and 21% reported their anxiety score higher than 50. The more depressed the patients, the higher levels of negative affect and anxiety they experienced. Those older patients tended to have a lower level of negative affect and those low-income patients were more depressed.

During the first six months, the mean scores of the MI patients' depression and negative affect decreased and positive affect increased significantly, but their anxiety level remained stable. When cut-off points were applied to divide the participants into depressed (with elevated depressive symptoms) vs. non-depressed and anxious vs. non-anxious, those who were depressed and anxious whilst in hospital reported a significant decrease by the end of six months. However, at all three assessments, the mean depression scores of those who were depressed at baseline remained higher than 16 and they were significantly higher than those who were not depressed at baseline. The prevalence of depressive symptoms at baseline (hospitalisation), 4-8 weeks and six months post-MI was 47.3%, 35.2%, and 36.3%, respectively. The percentage of patients who scored over 50 on state anxiety at each assessment was 20.9%, 18.7% and 22%, respectively. In general, the MI patients' depression, state anxiety and negative affect positively correlated with each other at same time and over the three time-points (hospitalisation, 4-8 weeks and six months post-MI).

12.1.2. Discussion of first-time MI patients' emotional responses

Depression

The average depression score of the current MI patients was higher than 16, and 48.7% of them reported a large number of depressive symptoms when they were in hospital. The prevalence of depression in this study was similar to a number of studies examined in first-time MI patients (Dickens et al., 2004b; 2005; Gilutz et al, 1991; Strik et al., 2003; Wiklund et al., 1984). When compared with studies that used first-time MI patients and those patients with previous MI, the prevalence of elevated depressive symptoms from the current study was also similar to these studies (Barry et al., 2007; Kamm-Steigelman et al., 2006; Shiotani et al., 2002; Steeds et al., 2004). However, in contrast to the two studies which used the CESD to measure depression (Berkman et al., 1992; Brummett et al., 1998), the current MI patients had a much higher percentage of depressive symptoms than the others (48.7% vs. 17% and 34.7%, respectively). The mean score of the current patients was also higher that than of Brummett et al. (1998) (17.02 ± 11.34 vs. 15.66 ± 11.37). As the current patients were younger than the participants of Brummett et al. (1998) (60.6 ± 12.49 vs. 63.4 ± 11.4), and Berkman et al. (1992) only examined patients over age 64, it was possible that younger MI patients would feel more depressed than older patients after experiencing an MI, as epidemiological studies showed that major depression is more prevalent in middle-aged and less prevalent in those over age 64 (Wilhelm et al., 2003). Several studies also reported that younger MI patients were more likely to report high depression scores (Barefoot et al., 2003; Frasure-Smith et al., 1999; Hance et al., 1996; Lane et al., 2000ab; Mallik et al., 2006; Mayou et al., 2000; Watkins et al., 2002; Ziegelstein et al., 2005). Another possible reason could be that those two studies both recruited mixed MI patients and that the experience of having a previous MI might help patients to be less depressed.

Over the first six months post-MI, the current MI patients' mean depression score decreased significantly, which was in line with Bennett et al. (1998, 1999a) and van Elderen et al., (1999), but different from some studies which reported stable depression over time (Mayou et al., 2000; Jacobsen et al., 1992b; Lane et al., 2000ab, 2001a, 2002a; Pedersen et al., 2004; Thornton et al., 1999). The possible reasons for the difference may be due to the facts that (a) some MI patients in the study of Mayou et al (2000) have already had an MI previously; (b) although Pedersen et al. (2004) and Thornton et al. (1999) used first-time MI patients, their baseline depression were measured after one month post-MI. By that time most MI patients would have been discharged from hospital for a while and maybe were getting used to the fact of having had an MI.

Another possibility was in relation to the fact that most of the past studies did not separate depressed MI patients (either major depression or elevated depressive symptoms) from non-depressed ones when reporting the prevalence of depression persistence. The current study showed that depressed patients' mean score decreased significantly, but this was not the case for non-depressed patients. Frasure-Smith et al. (2000b) and Steeds et al. (2004) both reported similar findings on depressed patients over 6-12 months. This shows that although using cut-off points could sometimes mislead result interpretation, as was reviewed in chapter 2; if it is used properly, it also helps researchers to gather more information about the development of depression after an MI. This is examplised in two studies (Kaptein et al., 2006 and Schrader et al., 2004). The first study not only used a cut-off point to examine depression, they also explored the changed patterns of depression among MI patients to gather more information. The second (Schrader et al., 2004) found that changes in depression happened mostly among those with mild in-hospital depression (CESD score 16-26), but not those non-depressed or severely depressed. If cut-off points were not used in these studies, this important information would not be represented.

The current study also found that those who were depressed during hospitalisation were more likely to remain depressed after six months. Compared with other studies, this study supported past research (Benedetto et al., 2007; Dickens et al., 2006; Lauzon et al., 2003; Luutonen et al., 2002; Mayou et al., 2000; Schrader et al., 2004; Stern et al., 1977) and it indicated that elevated depressive symptoms after MI was probably not a transient phenomenon. Lauzon et al. (2003) also reported that there was little change over the 1-year follow-up period of patients' depression. This suggests that patients' post-MI depressive symptoms could be present before the MI onset and they probably were not a direct consequence of the MI event. It also suggests a possibility of potential under-diagnosis and under-treatment of depression before MI. Hance et al. (1996) also reported that within cardiac populations, younger patients were more likely to progress from minor to major depression. Therefore, even though the mean depression score has the tendency to decrease over time among depressed MI patients, health professionals should still be alert to those who felt depressed during hospitalisation to prevent them remaining depressed in the future. In addition, attention should also be paid to why some patients developed new episodes of depression after discharge and why some depression remains unimproved.

Anxiety

The current MI patients reported their mean anxiety during hospitalisation as 36.19 ± 13.01, which was similar to the results of past studies (Cherrington et al., 2004; Frasure-Smith et al., 1999; Frazier et al., 2002; Lane et al., 2000ab, 2002a) and slightly lower than that of Thomas et al. (1997) and Benninghoven et al. (2006). However, the mean score (43 ± 10) reported by Crowe et al. (1996) was much higher that that of the current study. Comparing with the age 50-60 year-old healthy people and the general medical-surgical patients (Spielberger et al., 1983ab, 1994), the current MI patients' anxiety level fell in between. This suggested that although these patients were slightly more anxious than the general population, they were not as anxious as those who were going to have operations.

It is difficult to compare the prevalence of high anxiety amongst the studies as different measures and cut-off points were used. The current study employed a stringent criterion (cut-off = 50 on the STAI), as Fell et al. (1993) suggested. Therefore when compared with other studies, the current study might show a lower prevalence of high anxiety.

The current study also reported that first-time MI patients' mean anxiety score remained stable over time. This was in line with past studies of first-time MI patients (Benedetto et al., 2007; Bennett et al,. 1998, 1999ac; Dickens et al., 2006; Jacobsen et al., 1992; Pedersen et al., 2004). In accordance with Lane et al. (2000; 2002) and Mayou et al. (2000), this study also reported that those with high anxiety scores during hospitalisation tended to be more anxious at the later stage.

Overall moods

In terms of the overall emotional responses of the MI patients, it was found that depression, state anxiety and negative affect were highly correlated at all three time-points. This supported past studies (Day et al., 2005; Denollet & Brutsaert, 1998; Frasure-Smith et al., 1995ab; Lane et al., 2000ab), and it implied that these negative moods may influence each other to some extent. In addition, the significant correlation between age and negative affect, but not age with depression or state anxiety; and the significant correlation between depression, state anxiety and negative affect further indicated the possible multi-dimensions of negative moods and the necessity to measure them. However, one should also be careful about selecting different measures at the same time. For example, two findings in this study had caused some concerns: the CESD and the PANAS-negative scales. Their conceptual similarity and high correlation

encouraged selection of only one of them when using multivariate analyses in regression.

Another point was the relationship of negative affect and positive affect. Researchers have argued whether these two affects were bipolar or independent from each other (Drory et al., 2002; Russell & Carroll, 1999; Watson & Tellegen, 1999). It is possible that one can have both positive feelings and negative feelings at the same time (Watson & Pennebaker, 1989). The current non-significant correlation between these two measures suggested this could have happened and indicated how complicated human emotions could be.

12.2. What are first-time MI patients' illness perceptions during the first six months post MI?

12.2.1. The finding summary

Of the twenty-four listed individual MI causes, '*stress*', '*high level of cholesterol*', '*smoking*', '*eating fatty food*', '*heredity*' and '*hypertension*' were the top six MI causes that were attributed by the patients during hospitalisation. To examine the structures of MI patients' illness perceptions, principal component analysis was used. Three types of causal attributions ('stress', 'uncontrollable/external causes', & 'unhealthy lifestyles/behaviours'), two types of illness consequence perception (physical and emotional consequences), two types of illness control perception (active and passive control) and 'timeline' were found to represent the five theoretical structures. Pearson's correlation coefficients showed the more serious consequences the patients believed, the more symptoms they identified and the longer they expected their MI to be cured. In addition, the stronger they believed in uncontrollable/external causes, the stronger they believed nothing could be done; but the stronger they believed their MI was caused by unhealthy lifestyles, the stronger they believed they could control it.

The older the patients were, the less they believed in the causes of 'stress' and 'unhealthy lifestyles'. Older patients and those with low incomes also tended to believe their illness is out of their control.

Over the first six months post-MI, the patients' three main causal attribution components remained unchanged, as well as their perceptions of 'physical consequences', passive

control', 'symptom identity' and 'future MI threat'. However, patients' perceptions of 'emotional consequences' and 'active control' weakened and their perceptions of 'timeline' increased. At all three assessments, the stronger the patients attributed stress to their MI cause, the stronger belief they had in serious consequences. In addition, the stronger they believed in serious consequences, the longer they expected the illness would last, the more symptoms they identified, and the bigger the future threat they felt. Finally, the stronger they believed 'unhealthy lifestyles' caused their MI, the stronger they believed they could control their illness. However, if they believed in the causes that were beyond their control, then they tended to believe they could do nothing to change it.

12.2.2. Discussion of first-time MI patients' illness perceptions

Causal attributions of MI

The current patients' endorsement on each individual cause was quite similar to prior studies (Aalto et al., 2005; Cameron et al., 2005a; Fukuoka et al., 2004; Gudmundsdottir et al., 2001; Martin et al., 2005; Mumma & McCorkle, 1982; Petrie & Weinman, 1997; Weinman et al., 2000) and a systematic review (French et al., 2001), as 'stress', 'high level of cholesterol', 'smoking', 'eating fatty food' and 'heredity'/'hypertension' were on the list of top five most often agreed causes alongside with 'heredity'. This shows that these MI patients had a fairly clear idea about their illness. In addition, over 67% of the patients with a family history of CHD acknowledged that heredity could be one of their MI causes and around 78% of hypertensive patients recognised 'hypertension' as a cause. This was in line with the finding of Murphy et al. (2005). The high percentage of the current smokers' agreement on 'smoking' (83.9%) was also in agreement with Gudmundsdottir et al. (2001) and it reflected that the health campaign in the past has probably raised people's awareness of these possible causes. This finding also reflected that MI patients tended to seek behavioural causes as the possible explanations of their illness, which may imply their desire to try to gain their control of their life.

Although gender comparison was not the primary research aim, in the current study there were no significant differences on any of the three causal components and all but one of the individual causal attributions (pollution in the air), with male patients agreeing more on this. This was similar to the finding of Martin et al. (2005) as they also reported no significant differences between genders (n = 157) on stress, heredity and cardiac history attributions. However, they did find gender differences on diet, lack of exercise,

smoking and descriptions of pathophysiology attributions. King (2002) reported that although both male and female MI patients cited stress as a common cause, men emphasised more on work stress, behavioural/lifestyle causes and women were less likely to endorse smoking, diet or exercise as causes. In addition, Grace et al. (2005) also reported that male (n = 504) cardiac patients agreed more on diet/eating habits, overwork and alcohol than female cardiac patients (n = 157) and female cardiac patients agreed more on heredity than male patients. However, they included different cardiac patients such as MI, unstable angina, congestive heart failure, percutaneous coronary intervention or patients with coronary artery bypass graft surgery.

Several researchers have tried to examine whether different methodologies would lead to different causal attributions of heart disease (French et al., 2001, 2002, 2003, 2004, 2005bcd; Gudmundsdottir et al., 2001). Spontaneous, elicited, cued, implicit and explicit methods have been tested on extracting causes. The findings suggest that there were broad similarities when different methods were used, i.e., stress, smoking and lifestyle causes were on the top rank of causes across different methods. However, different findings such as the ranking of important causes, pattern of causes and number of causes were found to vary when different methods were used. This raises the question about what is the most appropriate method to measure MI patients' causal attributions. French et al. (2002) suggested that both implicit and explicit methods may each assess some aspects of causal attributions, but not all. These researchers also mentioned that although patients could cite many causes, they tended to focus mainly on one cause. Patients may construe 'cause' as either an ongoing disposition or a sudden trigger. While patients were trying to search causal explanations, their search was probably shaped or guided by an avoidance of blaming self or others and yet at the same time also seeking personal control over the situation (French et al., 2005c). This suggests that for MI patients, the purpose and procedure of seeking causal explanations could be complicated.

The structures of first-time MI patients' illness perceptions

The current study confirmed the theoretical concepts that illness perceptions contain illness causes, symptoms, consequences, timeline and cure/control. (Hagger & Orbell, 2003; Petrie & Weinman, 1997; Weinman et al., 1996). However, it also led one to question that these five theoretical components probably were too broad for the current MI patients. For example, in the current study, causal attribution was further divided into

three sub-components: 'stress', 'uncontrollable or external causes', and 'unhealthy lifestyles/behaviours'. Although these sub-components were quite similar to the findings of Petrie & Weinman (1997) - 'stress, lifestyle & heredity' ('heredity', in a way, is "uncontrollable"), both studies implied that MI patients not only tried to attribute their illness to some causes, but these causes also indicated whether they were 'controllable' or not (i.e. external causes or something they can change). In addition, given the findings that at each assessment, except for the correlation between 'stress' and 'unhealthy lifestyles/behaviours', none of these three causal sub-components significantly correlated with each other, this further indicated that these sub-components represented different attribution concepts and were probably independent to each other. Aalto et al. (2005) also factor analysed over 2700 CHD patients' causal attributions on 26 listed items. They extracted six components (stress, external factors, health behaviour, epidemiological risk factor, internal factor and life course) and two of these components (stress and external factors) were in agreement with the current findings.

Other evidence for more complicated illness components came from the perceptions of illness control and illness consequences. In the current study, cure/control perception was further divided into passive control and active control. Consequence perception was also further divided into physical consequences and emotional consequences. These results supported that MI patients not only categorised causes into controllable or uncontrollable but also linked these causes to actions whether they would be able to take into control. In addition, the positive correlations between 'uncontrollable (external)' causal attribution with 'passive control' perception, and between 'unhealthy lifestyles/behaviours' causal attribution with 'active control' perception further confirmed the close relationships of causal attribution with the MI patients' perception of action control.

Recently, Hirani et al. (2006) also reported using the original IPQ to measure three groups of coronary artery disease patients and the findings from their factor analyses indicated that along with illness 'duration' and illness 'control', illness 'impact' and 'self-image' were also generated. Illness 'impact' referred to the beliefs about "how the illness and its symptoms in particular affect the patient's life", which was very similar to the original term of 'illness consequences' but emphasised primarily on the consequences of illness symptoms rather than the illness in general. 'Self-image' referred to the beliefs about "how the illness has impinged upon the self-image of the patient" (Hirani et al., 2006) and in a way, 'self-image' was a sub-component of 'illness

consequences'. The results from this study and the current study both echoed the need of further examination of the original five illness perception components.

In general, results from a multi-response coding system showed that the MI patients reported 'fatigue', 'loss of strength', 'breathlessness', 'dry mouth' and 'sleep difficulties' as the top-five symptoms caused by their MI during hospitalisation. However, one should be cautious that 'sleeping difficulties' could also be caused by the fact that these respondents were in a strange environment and were regularly monitored by nurses or doctors during their sleep. In addition, as the current researcher did not acquire the patients' onset symptoms and these patients had already been treated before interviews, it was not surprising that 'chest pain' was not on the top of the list. In addition, when a dichotomous coding system was used, the top four symptoms remained the same, but 'sleep difficulties' was replaced by 'tightness in the chest'.

In the study of Hirani et al. (2006), 'fatigue', 'shortness of breath' and 'angina' (chest pain) were the three most 'frequently experienced' symptoms, followed by either 'loss of strength' or 'sleeping difficulties', depending on different treatment groups. These findings suggested that some common symptoms were shared by different cardiac patients along with specific symptoms provoked by different physiological problems. Therefore, when examining different groups of patients, researchers should be clear what could be the core symptoms.

Since there was no published norm for illness perceptions of MI, it is difficult to compare the current group with other populations. However, similar to the finding of Hirani et al. (2006), these MI patients also showed a level of uncertainty about the beliefs of illness perception subscales, as the mean score of all components was close to 3 ('neither agree nor disagree' or 'don't know').

The correlation between different components of illness perceptions also supported the suggestion that these components may not be independent (Hagger and Orbell, 2003; Petrie & Weinman, 1997). Those who agreed that 'stress' was one of the main causes tended to expect more serious 'physical and/or emotional' consequences and reported worse symptoms. It is unknown whether the MI patients were feeling stressed during their hospitalisation and/or expected 'stress' would continue to worsen their illness. However, stressed people tended to report more negative affect (Li & Tao, 2003) and Cameron et al. (2003) also found negative affect (e.g. anxiety) was linked to more perceived symptoms, so stress might influence illness perceptions.

Another example was that 'consequences', 'timeline' and 'future MI threat' showed significant positive correlations with each other. Those who held the belief of serious consequences also believed their illness was going to last for a long time, and they feared for another MI in the future. Although not exactly in line with previous findings, the positive correlation between 'timeline' and 'consequences' from the current study echoed the results of Petrie & Weinman (1997), Figueiras & Weinman (2000) and Bryne et al. (2005). Petrie & Weinman (1997) and Bryne et al. (2005) also found a positive correlation between more symptoms and worse consequences. Although Hirani et al. (2006) reported no significant correlations between 'duration', 'impact', 'control' and 'self-image', except for 'impact' and 'self-image'; the current study showed significant correlations between 'consequences', 'timeline' 'control' and 'symptom' perceptions correlated, depending on the assessment time. These results were also in line with the findings of Hagger & Orbell (2003).

Although 'future MI threat' was not included in the original illness perception components, its correlation with 'consequences' perceptions, 'timeline' or 'active control' perceptions at the second assessment or the final assessment indicated the importance of investigating MI patients' perception of future threat. Bennett (1992) reported that MI patients faced at least five types of threat: physical problems, medical therapy/self-care; work/physical activity; interpersonal/family; and financial. In this study, the significant correlations of 'future MI threat' with MI patients' negative moods at each assessment also implied the need to include it in the future research of illness perceptions.

Grace et al. (2005) reported that female CHD patients perceived a significantly longer timeline than men, while men perceived more personal control over their disease and greater treatment effect than females. This was not supported by the current study as there were no significant differences on any illness perception components between genders. It could be that the current study examined only first-time MI patients but Grace et al. (2005) recruited patients with different cardiac diseases.

When examining the correlation between the MI patients' demographic data with their illness perceptions, some interesting findings emerged - the older the MI patients were, the less they believed that 'stress' or 'unhealthy lifestyles' causal attributions could have caused their heart attack, and the less they believed in controlling this illness. This was in line with the findings of Gump et al. (2001). They examined the relationship of illness perceptions and age on patients with coronary artery bypass graft surgery and found that

older patients tended to believe that old age could be the cause of their CHD, but they were less likely to believe in genetics, unhealthy behaviours, health-protective behaviours and emotion. They were also less likely to believe they could control the disease after the surgery. Although French et al. (2005a) reported that older patients believed in a shorter timeline and less worse consequences, it was not supported in the current study.

Leventhal et al. (1998) has suggested why age can moderate the self-regulation process. When one gets old, his/her social roles, social expectation, and work status may all change. These changes can lead to the changes of self-regulation processes. For example, in this study, a lot of the patients were retired and they did not agree that their life was more stressful than younger patients' lives. Besides, these older patients might think that since they have been living the same lifestyles for such a long time, if lifestyle was related to MI, they would have had an MI much earlier in their lives. In addition, in terms of the older MI patients' perception of 'passive control' of their illness, it was possible that older patients' life experiences, in a way, have shaped their life attitudes to be more '*carefree*' or '*take it as it comes*'. Therefore, they tended to have less confidence in being able to control their MI.

In summary, what has been found between age and illness perceptions from this study was consistent with some previous studies in MI populations (Figueiras & Weinman, 2000) and patients following coronary artery bypass graft surgery (Gump et al., 2001) as age seemed to play an important role in illness perceptions.

How stable are MI patients' illness perceptions over time?

The early studies of Leventhal et al. (1984) showed that based on symptom perceptions and timeline, patients would initially regard their illness as acute and believed their illness would go away if given time, or it would be treatable. The onset of MI symptoms often comes on suddenly and people may wait for them to resolve. This may explain why some patients delay seeking medical help. Once they are treated and the symptoms are gone, they may think the illness is cured. In a qualitative study, Brink et al. (2006) found that several of their patients viewed their MI as an acute rather than a chronic condition. Wiles and Kinmonth (2001) also reported that information given by health care professionals seems to encourage patients to view MI as an acute event. If healthcare professionals give out the signals that MI is acute, it may not motivate patients to

acknowledge that they need to adapt themselves to live with their condition and motivate to change their lifestyles. This may restrict patients' attitudes of self-managing their illness on a daily basis (Koch et al., 2004).

The significantly increased timeline perception among the current study indicated these MI patients may regard their illness as acute at the onset and then gradually believe more strongly that their condition is chronic, as they perceive stable symptom identities over time. Therefore, this finding was in agreement with studies of CHD patients (Petrie & Weinman., 1997; Sheldrick et al., 2006; Weinman et al., 1996), which showed an increased timeline perception and a stable symptom perception. Although Zerwic et al. (1997) reported that 63% of their in-hospital MI patients believed their disease would be a chronic condition, they interviewed patients with only an open-ended question "Is heart disease an illness that is an acute, short-term or chronic, long-term problem?" This may explain why more patients believed that their illness was chronic.

Once the timeline perception changes from acute to chronic, the perception of cure/control may also change to match timeline perception (Leventhal et al., 1984; Petrie & Weinman., 1997; Weinman et al., 1996). Therefore it is reasonable that patients' cure/control perception may weaken over time. In the current study, the patients' active control perception decreased significantly ($p = 0.005$). In a way, this still supports the findings of Petrie & Weinman (1997) and Sheldrick et al. (2006) as they also reported a significantly decreased perception of control from their MI/CHD patients. Although the current patients' passive control perception remained stable ($p = 0.04$) over time, its concept is more related to external control (like fate). Therefore it did not change over time.

The current study revealed that over the first six months post-MI, the patients' three causal attribution components (stress, lifestyle, uncontrollable causes) remained stable. Judging by the fact that this finding is in line with others (Cameron et al., 2005; Gudmundsdottir et al., 2001; Murphy et al., 2005; Petrie & Weinman, 1997; Weinman et al., 1996), it indicates that MI patients may form their causal attributions at a very early stage. Because health campaigns have been focusing on raising peoples' awareness of heart diseases, these causal attributions may be prototypic and readily available in peoples' schematic memories and remain relatively unchanged, as was discussed by Bishop (1987), Prohaska et al. (1985) and Petrie & Weinman (1997). However, it could also be possible that these patients were induced to be consistent to give the same

answers when the same questionnaires were presented to them repeatedly (Cameron et al., 2005; Petrie & Weinman, 1997; Sheeran & Orbell, 1996).

In addition to the changes in active control and timeline perceptions, this study also reported a decrease in patients' perception of emotional consequences. It is possible that once patients were more convinced that their illness was chronic and they could learn to live with it, they would feel its emotional impact as less serious.

12.3. Will illness perceptions, social support and coping contribute to first-time MI patients' moods during the first six months post-MI?

12.3.1. The relationships between illness perceptions, social support and coping with post-MI moods

Illness perceptions

Findings from the current study showed that MI patients' negative illness perceptions such as believing in serious 'physical/emotional consequences', perceiving more symptoms, fearing that they would have another MI, and a longer timeline strongly correlated with worse depressive symptoms and anxiety levels. These findings were similar to that of Cherrington et al. (2004), French et al. (2005a) and Miller (1988). It also was in agreement with a study of Type 2 diabetic patients (Paschalides et al., 2004). However, unlike Paschalides et al. (2004), the current MI patients' control perception did not significantly correlate with their depression or anxiety. Compared with diabetes, MI is a more acute and serious illness. It is possible the current patients were unsure of the concepts of 'control', or they were not sure what controlling their illness would involve. For this reason, the relationships between control perception and negative moods were not significant.

These findings supported the CSMI concepts as Leventhal et al. (1984, 2001) theorised cognitive representations and emotional representations may evolve in parallel but also feedback to each other at the same time. These findings not only reflected Hagger and Orbell's recent study on people with abnormal screening results (2006), they are also in keeping with Hagger and Orbell's meta-analytic review of chronic illness patients (2003), which obtained positive relations between negative illness perceptions and psychological distress, and negative relations between cure/control perceptions and psychological distress.

In a study of CHD patients, Cameron et al. (2005) claimed that anxiety, but not depression or negative affect, significantly correlated with stress attributions. Their patients tended to assess their mood state when they evaluated whether recent events have been stressful enough to contribute to their MI. Cameron et al. (2005) suggested that anxious mood is the key emotional factor that influences stress attribution. This was not supported by the current study at the first two assessments, as no significant correlations between depression/anxiety with causal attribution components were found. However, at the 6-month post-MI, stress causal attribution positively correlated with the patients' depression and anxiety (with a medium effect size). At time 2, stress attribution also positively correlated with time 3 depression and anxiety. This may support the finding from French et al. (2005a) that 'stress' correlated with future emotional quality of life.

The current study also found that when comparing depressed/anxious versus non-depressed/non-anxious MI patients, the depressed patients tended to be more inclined to attribute "depression', 'stress' and 'family problems/worries' as the MI causes. The anxious patients also tended to attribute 'depression' or 'family problems/worries' as the causes. Although this finding was just a comparison result and should not be interpreted with cause-effect, it was partially in concordance with Day and colleagues' findings (Day et al., 2005). They found that depressed/anxious cardiac patients were more likely to endorse negative emotions (e.g., stress, depression, anger, nervousness, fear or loneliness) as causes of their heart disease. Grace et al. (2005) also reported that cardiac patients' depressive symptomatology (measured by HADS) positively correlated with greater endorsement of stress/worry, mental attitude, family problems, emotional state, personality and overwork ($p < 0.001$). Therefore, even if one could not support the claim that anxiety would influence MI patients' attributions, it was possible that there could be a link between MI patients' negative moods and the way they perceive and interpret their illness.

One interesting finding was related to the MI patients other mood dimensions and their illness perceptions. Very few studies have examined MI patients' emotional responses other than anxiety and depression. The current study found that, similar to depression and anxiety, the MI patients' negative affect also correlated with worse consequence perceptions and more symptoms at each assessment. As depression, state anxiety and negative affect were highly correlated, it was not surprising that illness perceptions which correlated with depression and anxiety would also correlated with negative affect.

However, the current study had one unique finding about positive affect. Although the MI patients' positive affect did not significantly correlate with any of their illness perceptions at time 1 and time 2, it negatively correlated with their emotional consequence perception, MI threat and symptom perception at time 3 and it positively correlated with active control perception. As positive affect negatively correlated with depression and anxiety at the early stages, it was possible its significant correlation with illness perceptions was suppressed by these two negative moods.

Grace et al. (2005) examined the correlation between depressive symptoms and illness perceptions between male and female CHD patients. They found that males who perceived a longer timeline, worse consequences and lower treatment control were more depressed. For females, a longer timeline perception was correlated with depressive symptoms. Unfortunately, because the current study contained only a small number of females, the comparisons between genders would not be statistically meaningful.

Social support

In this study, social support was measured twice after discharge. Except for perceived total support and friend's support, none of the perceived 'special one's support' and 'family support" changed significantly over time. It was also found that the perceived availability and adequacy of support did not change over time. However, perceived total support and friend's support did decrease significantly from 4-8 weeks to 6 months post-MI. This was similar to the finding of Pedersen et al. (2002) and it reflected that in reality, support providers normally only give support when a special event just happens. Once the support providers have got used to the situation, the support they give will normally decrease. In addition, if the support receiver, i.e. an MI patient, still holds the same levels of in-hospital expectations after they are discharged from hospital, he/she may find the difference between their expected support and perceived support will become larger. As no cut-off point can be used for social support scores, it was difficult to decide whether these MI patients' perceived support had reached certain levels or not. In addition, it was difficult to examine whether social support will interact with depression or state anxiety (Frasure et al., 2000b).

Although previous research suggested social support positively correlated with MI patients' psychosocial progresses, including moods (Barefoot et al., 2003; Frasure-Smith et al., 2000b; Drory et al., 1999; 2002; Pedersen et al., 2002), it was not confirmed in this

study. None of the different types of perceived social support significantly correlated with the MI patients' moods. It could be that a lot of the MI patients in this study were either living alone or widowed. Therefore, 'special one's support' and 'family support' could not really apply to them.

Previous studies also suggested that support perception may be influenced by the respondents' mood. For example, those who were depressed may tend to have negative perceptions or explanations on others' support behaviours. It could also be the case that depressed people tend to be less willing to interact with others. Therefore, it is more difficult for them to get support from others. However, in the current study, there was no significant difference between depressed and not depressed MI patients. Nor was there significant difference between anxious vs. not anxious MI patients. In addition, at time 2, none of the correlations between social support and the MI patients' moods were significant. At time 3, the less the patients perceived total support, the more anxious they were, and the more they felt about a special one's support, the higher positive affect they had. For these reasons, this study could not support studies of Barefoot et al. (2003), Frasure-Smith et al., (1995a, 2000b, 2003) and Drory et al. (1999, 2002).

Coping

Similar to social support, coping was measured at both 4-8 weeks and six months post-MI. For both time points, the current patients' four most frequently used coping strategies were acceptance, active coping, accepting emotional support and planning. Their least used two coping were substance abuse and behavioural disengagement. These patterns matched the findings of Bennett et al. (1999c) on a small group of first-time MI patients between hospitalisation to 3 months post-MI. After factor analysing the original COPE on 128 MI patients, Lowe et al. (2000) also reported that acceptance-focused coping was the most frequently used strategy, followed by problem-focused coping, social or emotional-focused coping and avoidant-focused coping. Although other studies used different coping scales (Bogg et al., 2000; Kristofferzon, 2005; Van Elderen et al., 1999), in general, they found that MI patients tended to use more problem-focused or confrontive than emotional or avoidant coping.

In the current study, only 'accepting emotional support' decreased over time and the remaining thirteen coping strategies were stable. This partially supported what Bennett et al. (1999c) have found in 37 first-time MI patients. In their study, 'accepting emotional

support' remained stable within the first 3 months after hospital admission as did other coping strategies, except for 'distraction' and 'reframing', as these two strategies decreased significantly. As Bennett et al. (1999c) measured coping at hospitalisation and 3 months after MI, it is possible that at this time people surrounding them would still offer much more support than usual. Therefore their patients would probably not feel the decreased level of support. Lowe et al. (2000) also reported that all coping components remained stable over time, except for problem-focused coping, which increased significantly from in-hospital to 2 months and then remained stable over another 4 months.

Although the current study did not categorise the 14 coping strategies into broader strategies (i.e. problem-focused vs. emotional-focused coping), it was found that 'denial', 'disengagement', 'venting' and 'self-blame' continuously and positively correlated with MI patients' depression over time, and 'disengagement', 'venting' and 'self-blame' positively correlated with higher anxiety at time 3. Also, time 2 active coping and positive reframing correlated with higher positive affect. This was in keeping with studies of MI (Bennett et al., 1999c; Lowe et al., 2000; Gracia, 1994) and heart failure (Park et al., 2006; Vollman et al., 2007).

Despite that 'denial' coping was reported to be beneficial to physical health when the bad event had just happened (Goldbeck, 1997; Lowery et al., 1992), in general, it was considered to be harmful for long-terms health. Although 'denial' coping was not measured during patients' hospitalisation, its influence on negative moods was supported in this study and consistent with those of Kennedy et al. (1995) and Landreville & Vezina (1994). However, one finding which conflicted with that of Lowe et al. (2000) but was in line with Chalfont & Bennett (1999) and Bennett et al. (1999c) was that in the current study, 'planning' coping positively correlated with the MI patients' negative moods. As explained earlier, it could be that 'planning' reminded these patients of their illness. In addition, during the planning processes, patients might feel uncertain and this may result in their negative mood.

The current study also revealed that when comparing the patients with high/low depressive symptoms or high/low anxiety on their coping, it was found that depressed patients significantly used more denial, self-blame venting or planning at time 2 and time 3. Anxious patients tended to use more substance abuse and venting at time 2. The Beck depression theory emphasised that depressed people may process incoming information differently from healthy people. If this is true, one may argue that these

depressed/anxious patients might have different cognitive representations which lead them to use these coping strategies more often, even if these strategies were not helpful to their mood.

A recent review (Kristofferzon et al., 2003) reported that female MI patients used more types of coping strategies than men and they minimised the impact of MI. Women tended to receive less social support up to one year post-MI and received less assistance with household duties. The current study did not support these findings. However, because there were few females in this study, these findings may reduce statistical power.

12.3.2. What are the comparative roles of illness perceptions, social support and coping strategies on moods during the first six months post-MI?

To test the independent roles of illness perceptions, social support and coping strategy on MI patients' mood, a series of multiple regression analyses were computed. The results, in general, suggested that when other variables (i.e. coping or other mood) were not considered, illness perceptions, in particular symptom perception, significantly explain the MI patients' cross-sectional negative moods (depression, anxiety and negative affect). Once coping strategy and other mood variables were considered, the overall illness perceptions still significantly explain negative moods, but individual illness perception components was not as important as moods or coping strategies. These findings indicated that although illness perceptions could influence depression and anxiety, the influential power of other negative moods was greater than illness perceptions. These findings also showed that certain types of coping strategies may have a direct and greater influence on negative moods than illness perceptions.

Of the illness perception components, symptom perception was the more powerful contributor to depression, anxiety and negative affect, followed by the perception of serious consequences. This seemed logical as in the CSMI, illness perceptions were triggered by symptom perceptions.

When using baseline (in-hospital) illness perceptions and moods to predict 6-month post-MI moods, it was found that in-hospital negative moods (depression or anxiety) was the only significant predictor of depression and negative affect at six months, but external causes, future MI threat, and baseline anxiety/positive affect were the significant predictors of 6-month anxiety. This supported the finding of Michie et al. (2005). They

reported that baseline depression and anxiety was the best predictor of depression or anxiety at follow-up (8 months post event) in a group of CHD patients. This finding also suggested that unlike depression, anxiety was more likely to be triggered by the perception of whether self could control the situation.

When coping strategies were entered into multivariate regression models to explain the MI patients' moods, very few of them were able to significantly contribute to moods. In total, only 'substance abuse' and 'self-blame' could explain depression, 'positive reframing' could explain positive affect, and 'denial' could explain negative affect. Compared with other studies (Benedetto et al., 2007), the current results seemed to be less persuasive. It is unknown whether the results would be more in line with other studies if factor analysis was used to combine these fourteen strategies. However, as the brief-COPE author was against using factor analysis so one can understand each specific coping strategy in details, these less persuasive findings might be the trade-off between either focusing on broader or more specific aspects of coping.

12.3.3. Will social support and coping strategies mediate first-time MI patients' illness perceptions and moods?

The current study explored whether social support or coping would mediate illness perceptions and MI patients' moods. Very few studies have examined the mediating role of coping on illness perceptions and moods among chronic illness patients and most of them were conducted among patients with arthritis (Carlisle et al., 2005; Murphy et al., 1999; Scharloo et al., 1998; Sharpe et al., 2001), irritable bowl syndrome (Rutter & Rutter, 2002, 2007) and Huntington's disease (Kaptein et al., 2006). However, the results of whether coping strategy mediates illness perceptions and illness outcomes were inconclusive in these studies.

Because social support did not significantly correlate with illness perceptions and moods in this study, it was impossible to test its mediating effect on these factors. As several previous studies have reported a significant role of social support on MI patients' recovery, it was surprising that the same finding was not repeated here. Although the concept of social support was not included in the CSMI, based on the view that social support is one of coping's assistance (Thoits, 1986), one would expect that social support would correlate with illness perceptions as well. However, it was not the case in this study. Because social support is a very complicated concept and has a variety of dimensions, it was possible that the content of social support measured in this study was

not as specific as that of coping strategy. So far, there is still a debate about the direct protective and buffering effect of support. It could be possible that support moderates, but does not mediate illness perceptions and moods. However, maybe due to the assessment time point or measurement tool used in this study, this was not tested.

Pedersen et al (2002) reported that personality traits might mediate social support and its effect on distress. Blumenthal et al. (1987) also reported that Type-A behaviour interacted with perceived social support. These two studies showed that probably in this study, social support did not have direct correlation with post-MI moods. However, its effect on moods might be mediated or moderated by personality. This deserves examination in the future research.

In terms of the mediating effect of coping strategies, it was found that 'denial' partially mediated 'passive control' perception and 'depression'; and 'self-blame' coping strategy also partially mediated 'stress' causal attribution and 'depression' at 4-8 weeks post-MI. It was possible that feeling unable to control their MI made the patients engage in more 'denial' coping that resulted in depressed feeling. In addition, modern society has emphasised that how people can benefit from managing stress. If the MI patients felt 'stress' was the possible cause, they might blame themselves not to manage it well, and this could lead to depressed feeling. Roesch & Weiner (2001) conducted a meta-analytic review on causal attribution and coping, and they reported that attribution dimensions might have more direct implications for emotional-focused coping than problem-focused coping. Their findings appeared to be supported in the current study.

Carlisle et al. (2005) reported that 'avoidant coping' partially mediated symptom perception and illness outcomes like disability and psychiatric morbidity among rheumatoid arthritis patients. In their study, other coping strategies did not mediate any of the illness perceptions and outcome measures. Scharloo et al. (1998) also found no evidence to support the claim that coping is a mediating factor between illness perceptions and outcome measures in rheumatoid arthritis. Finally, Kaptein et al. (2006) and Rutter & Rutter (2002, 2007) also did not find mediating effects.

Based on the CSMI, one would expect that coping strategies should mediate the MI patients' illness perceptions and moods. However, the current results could not fully support the CSMI. A number of reasons may explain this. First, there might be too few MI participants. Therefore it was difficult to detect significant correlations between illness perceptions, coping and moods. Secondly, as mentioned previously, it could be that

specific coping strategy was not sensitive enough to reflect the potential influences of broader coping strategies. Another alternative explanation is that in the CSMI model, a broad concept of coping is used. There is no clarification about whether specific types of coping strategies will link with specific patterns of illness perceptions or specific emotional responses. This may indicate the inadequacy of the model.

12.4. What are first-time MI couples' emotional responses during the first six months post-MI?

This study revealed that when the MI patients were in hospital, their spouses reported higher levels of depression, state anxiety and negative affect than the patients themselves. In addition, there were more spouses than patients whose depression (69.05%) and state anxiety (40.5%) scores reached cut-off points. Furthermore, from patients' hospitalisation till six months post-MI, the mean scores of the spouses' depression, state anxiety and negative affect were higher than the patients' responses. Although this finding was in line with that of Arefjord et al. (1998), Mayou et al. (1978), Moser & Dracup (2004), Newens et al. (1995) and Skelton & Dominian (1973), it seemed quite straightforward that the current spouses responded worse than the patients did. However, because the majority of the current spouses were females, and past studies have reported that females tended to report higher negative emotions when facing stressful events like MI (Barefoot et al., 2003; Brummett et al., 1998; Frasure-Smith et al., 1999), a question has emerged: "Were the differences between couples' moods due to their roles (patients vs. spouses), or because the majority of the spouses happened to be females?"

Unlike many other studies on MI couples that did not consider whether female spouses' gender might confound with their role as a spouse (partner), the current study continues to clarify this gender/partnership issue. Chapter 10.2.1 has presented two approaches to distinguish this and the results from both methods showed that the difference on the couples' negative affect could be explained more clearly by 'patient versus spouse' status. However, the differences on the couples' depression and state anxiety could have resulted from males versus females, not patients versus spouses. As before age 60, more males than females tend to have an MI, it is difficult to recruit equal numbers of male and female MI patients, let alone recruiting enough male and female first-time MI patients. It would be even more difficult when spouses are also recruited. Therefore,

while designing research on first-time MI couples, this practical issue needs to be taken into consideration.

Another finding was that none of the MI couples' moods, even the same types of moods, were significantly correlated. This conflicted with the findings of Suls et al. (1997). In their study, the male MI patients' distress positively correlated with their wives' distress at the same time and over time. Moser & Dracup (2004) also reported MI or revascularisation patients' anxiety and depression which correlated significantly with their spouses' (86% female spouses) depression and anxiety. Since couples are normally regarded as the closest among family members, it was expected that after experiencing an MI event, they would respond with similar moods. Judging by the current results, it was possible that the current MI couples tried to hide their moods from each other. Maybe they tried not to share their moods with each other, because they did not want the other half to worry (Suls et al., 1997). It could also be that even in encountering the same threatening event, couples may emotionally respond to that event independently. Kettunen et al. (1999) found that MI spouses' emotional responses to the MI event were not simply a response to just the MI. Their fears could be divided into disease-related fears and personal fears. In reality, when an MI happens to one of the couples, the other one immediately faces different challenges, including looking after the patients, the family and other issues. As Coyne & Smith (1991, 1994) commented, MI couples face three main tasks that would potentially conflict with each other: "managing one's own distress, attending to various instrumental tasks, and grappling with each other's presence and emotional needs." They examined the MI spouses' distress and found it not only was related to the patients' MI and health care issues, it was also related to marital quality. Strating et al. (2007) examined the effects of rheumatoid arthritis on couples' distress and reported that couples' distress were explained by different variables, as for the patients, their disability was a primary stressor, but for the partners, their burden was a primary stressor. These findings gave a reasonable support to why the current MI couples' moods did not correlate significantly.

As the current MI couples were not interviewed or requested to answer questions about their interaction and communication after the MI event, it was difficult to explain this result. It was also possible that because only 35 MI couples completed assessments at three time-points, the results might be biased. No matter what reason might have caused this, it indicated that one could not really predict individual couple's moods simply by knowing their spouse's moods.

Over the first six months post-MI, the patients' depression, state anxiety, positive and negative affect all remained stable. Although the spouses' depression and negative affect remained much higher than the patients' scores, they both decreased significantly, while their state anxiety and positive affect remained unchanged. As depression and negative affect was highly co-morbid, it was not surprising that both negative moods would decrease together. This study mirrored the findings from Rose et al. (1996), which reported that although both couples were distressed by MI, the distress lasted longer for spouses. It could be, as Croog & Fitzgerald (1978) noted, the spouses of heart patients experienced long-term, unchanged stress after the heart event, and the stress did not just come from the patients' medical problems. Therefore the MI spouses may experience long-term negative moods. However, this study did not support that of Arefjord et al. (1998). They measured 37 MI wives' depression and anxiety over 10 years and found wives' anxiety level decreased significantly but their depression remained stable. They also found these wives could be divided into 4 groups, according to the change of their depression or anxiety.

12.5. What are first-time MI couples' illness perceptions during the first six months post-MI?

When the MI couples' illness perceptions were compared, it was found that during the patients' hospitalisation, only 'lack of exercise' cause and 'sleep difficulties' symptom have showed significant differences between the couples. All the other illness causes showed no significant differences, regardless of whether healthcare professionals have given them information concerning the MI or not. These findings were in line with others (Billing et al., 1997a; Croog & Richard, 1977; French et al., 2005b; Weinman et al., 2000). One interesting finding was that the spouses agreed more on 'lack of exercise' as a cause of MI than the patients. French et al. (2004) concluded that the differences in causal attributions of patient and non-patient samples may result from different methods, but not actor-observer differences (Turnquist et al., 1988). The 'actor-observer difference' suggests that actors tend to attribute their actions to situational requirements and observers tend to attribute the same actions to stable personal dispositions (Jones & Nisbett, 1972). Although Watson (1982) and Nisbett et al. (1973) argued that once the observer is familiar with the actor, the tendency of observers to attribute actor's actions on stable dispositions will be reduced, it may not be the case here. As 'lack of exercise' is a behavioural and also a habitual cause, these spouses could regard 'lack of exercise' as

a simple fact that the patients did not have time or did not make time to exercise, or they could also link it to patients' disposition of disliking doing exercise.

One should be aware that unlike the current study, others (French et al., 2005b; Weinman et al., 2000) factor-analysed MI couples' causal attributions separately, and their results showed that MI couples, although shared two similar causal components (lifestyle cause & stress cause), had one different causal attribution ('heredity cause' for patients and 'family distress' for spouses). Comparing those studies with the current one, one may wonder whether it is appropriate to apply patients' illness perception components to spouses'. However, as there were very few spouses in this study, it seemed this was the only way to examine patients and spouses together.

Unlike moods, most of the MI couples' same types of illness perception components significantly correlated with each other. This probably was due to the fact that while the patients were in hospital, instead of meeting the patient alone, the cardiac nurses tended to meet the couples together. Although the MI couples might not share their emotions, they had chances to get information and discuss questions together with health professionals. Therefore, their same types of illness perceptions were more correlated.

The influences of couples' illness perception agreement on their individual moods were examined by following the same method used by Figueiras & Weinman (2003). The current results supported the previous finding (Figueiras & Weinman, 2003) that couples' differences in 'stress causes', 'physical consequences' and 'symptom perceptions' would distinguish their own negative moods, in particular depression. It was also found that either patients or spouses from the group that both couples agreed on serious physical consequences or worse symptoms reported higher levels of negative moods than patients or spouses from the groups that couples either both disagreed or had dissimilar opinions on these illness perceptions.

Although two other approaches were used ('patient's minus spouse's illness perception score' and the mean score of 'patient's plus spouse's illness perception') to detect the influences of the couples' illness perception differences on their individual moods, one must be aware that these results should be treated with great caution, as there were very few couples in this study. In addition, one should also be aware that these three approaches all assume that couples' illness perceptions could be interpreted in the same way. Whether this assumption is reasonable or not is still unknown. However, if one ignores these questions, these three approaches also offered researchers a chance to

explore the possible relationships between MI couples' illness perceptions and moods. Clearly, these findings have suggested that MI couples' moods not only could be influenced by their individual illness perceptions, their partners' beliefs about the MI also play important roles.

The current study on MI couples supports previous research of couples' causal attributions (Billing et al., 1997a; Figueiras & Weinman, 2003; French et al., 2005b; Weinman et al., 2000). In addition, this study also supports Figueiras & Weinman (2003), in that couples sharing similar negative illness perceptions would have worse emotional responses.

12.6. Will first-time MI couples' illness perceptions, social support and coping contribute to their moods during the first six months?

Summary of findings

Both the MI couples' in-hospital negative moods significantly correlated with their own perceptions of illness consequences and other illness perception components. During the first six months post-MI, both of the couples' negative moods correlated with their own illness perceptions, but not with the other's illness perceptions.

In addition, the spouses who were in the group where both couples believed in 'stress' causes and more serious 'physical consequences' tended to be more depressed, anxious and had a higher level of negative affect than spouses of the other two groups. The patients who were in the group that both couples reported/or observed worse symptoms tended to have higher levels of depression and anxiety than others.

When combining the couples' illness perceptions together, it was found that the stronger the couples believed in the serious consequences of the MI, the more the patients felt depressed or negative. In addition, the stronger the couples believed in long illness timeline, the more the patients felt anxious. Furthermore, the couples' illness perception differences also played a role on their individual moods. Although the couples' moods did not correlate significantly with each other, the 'interactions' of their illness perceptions might have close relationships with their own moods.

None of the couples' perceived support changed significantly, but the patients perceived more 'total support' and 'special one's support' than their spouses. Unlike previous studies (Hallaraker et al., 2001; Kettunen et al., 1999), this study did not find social support significantly correlated with either patients' or spouses' moods. As discussed earlier in the patient's section, the non-significant findings could be a result of measurement tool, measuring time points or a small sample size.

'Accepting emotional support' and 'planning' coping strategies decreased from 4-8 weeks to 6 months post-MI. Although the patients used more 'accepting emotional support' and 'humour' than the spouses, there were no any significant differences on other coping strategies between the couples, which was different from the findings of Stewart et al. (2000), as they reported that spouses and patients used diverse strategies to cope with the stresses of MI. Both of the couples' 'self-blame' coping strategy significantly correlated with their own negative moods. The spouses' 'denial' coping also positively correlated with the spouses' negative moods. In addition, the spouses' positive affect positively correlated with their 'active coping', 'acceptance', 'accepting instrumental support', and 'positive reframing'.

Will couples contribute to each other's moods?

To explore possible answers of this question, a series of multivariate regression analyses were computed. It was found that in general, the MI couples' moods were mainly explained or predicted by their own mood states, coping strategies or illness perceptions. The results of the current study also indicated that most of the coping strategies did not play significant roles on the MI couples' individual moods, except for the spouses' 'humour' coping, 'substance abuse' coping, and the patients' 'denial' coping and 'self-blaming' coping. The first two strategies made significant contribution to the patients' state anxiety and positive affect at time two, respectively. The later two strategies contributed significantly to the spouses' negative affect at time two.

This finding was in contrast to some previous findings. For example, Moser & Dracup (2004) reported that cardiac spouses' anxiety, depression and perceived control remained significantly correlated with the (417) patients' psychosocial adjustment to illness even after controlling for the patients' anxiety and depression. Bennett & Connell (1998a, 1999b) also reported that of the (43) MI couples, the partners' depression was significantly predicted by the patients' emotional state and coping behaviour. In cancer

studies, Ben-Zur et al. (2001) reported that 73 breast cancer patients' psychological adjustment was significantly predicted by their spouses' emotional-focused coping. Northouse et al. (2000) also found that among 56 Colon cancer couples, the strongest predictors of patients' adjustment were hopelessness and spouses' role problems.

Several reasons may explain why the current study did not have a similar finding of couples' influences on each other. First, one should be aware that only 35 couples were analysed in the longitudinal results. In addition, the nature of MI and its progress and treatment is quite different from cancer. Thirdly, the measurement time and measurement scales may also contribute to the differences between the current study and others.

12.7. Clinical implications of the current study

Although cardiac rehabilitation is not one of the main themes in this study, findings of this study have reinforced the needs for health professionals to be aware of the importance of MI patients' illness perceptions, social support and coping strategies on their moods. In addition, it also offers health professionals a chance to consider the importance of patients' family, particularly their spouses' (or the main caregivers) in relation to patients' recovery.

Integrating illness perception concepts into cardiac rehabilitation

For MI survivors, one of the most important things is to prevent further MI/cardiac events. Cardiac rehabilitation is regarded as the key strategy for helping MI survivors because coronary heart disease patients are found to have low levels of adherence to exercise/dietary change, smoking cessation and medications (Haynes, 2001; Oldridge, 2001). The review from Zafari & Wenger (1998) suggested that MI survivors who quitted smoking reduced further MI by 50% after one year and those participated in exercise training and risk factor modification increased 20% survival rate in three years. Another meta-analytic review of 37 cardiac rehabilitation programmes also reported a 34% reduction in cardiac mortality and 29% reduction in recurrence of MI from two to 10 years after the cardiac programmes (Dusseldorp et al., 1999).

The original cardiac rehabilitation concept defined by WHO (1993) differentiates three aims – *medical aims* (e.g., cardiac mortality prevention and morbidity reduction),

psychological aims (e.g., restoring patients' self-confidence, reducing anxiety/depression), and *socioeconomic aims* (e.g., return to work, normal daily life function, reducing medical costs). In general, cardiac rehabilitation is divided into three phases (Denolin, 1985), although Great Britain and several other countries (e.g., USA) have extended it to four phases. Phase I concerns treatment in the hospital. Phase II is the early post discharge period. Phase III involves late post discharge period and Phase IV is for long-term maintenance at home (Bethell, 2000; Thompson et al., 1996).

Currently, cardiac rehabilitation models focus on 'educating patients'. MI patients are "taught" by health professionals about the basic structure of a heart, the possible causes of MI, and the importance of keeping healthier diets and active lifestyles to prevent further cardiac events. Although these may benefit patients, patients are essentially regarded as passive consumers/receivers and the core belief of these rehabilitation programmes is that by acquiring knowledge, patients will be affected to improve their behaviour. However, this kind of programmes has been criticised and shown to be ineffective in helping changes in some chronic illnesses (Griffin et al., 1998; Newman et al., 2001).

Another issue is the low attendance and high dropout from rehabilitation programmes (Ades et al., 1992; Bethell et al., 2001; Lane et al., 2001b; Swanton, 2006). According to a systematic review by Cooper et al. (2002), non-attendants of cardiac rehabilitation tended to be older, to have lower incomes, to minimise the illness severity, and to disbelieve they can influence its outcomes. Yohannes et al. (2007) reported that those dropped out from cardiac rehabilitation tended to be females, younger, more depressed or anxious, with less severe expectations on illness consequences and with lower treatment control.

Although French et al. (2005a) did not find a significant link between MI patients' beliefs and cardiac rehabilitation attendance, several studies have shown some significant relationships (Cooper et al., 1999; 2005; 2007; Petrie et al., 1996; Whitmarsh et al., 2003; Yohannes et al., 2007). Through qualitative interview, Cooper and colleagues (2005; 2007) reported that 'perceived necessity', 'concerns about exercise', 'practical barriers', 'cardiac knowledge', 'content of rehabilitation', 'rehabilitation benefits' and 'perceived personal suitability' were the main issues related to rehabilitation attendance. All these issues link with MI patients' perceptions of their illness. Finally, a recent meta-analytic review (French et al., 2006) also reported that patients' beliefs in four illness perception constructs significantly predicted cardiac rehabilitation attendance – understanding what

is going on, being able to control/cure the illness, feeling more symptoms and expecting serious consequences.

Based on the findings that –
(1) Perceptions of serious illness consequences, more symptoms and future MI threat were related to more severe depression and anxiety from this current study and previous studies (Paschalides et al., 2004; Petrie et al., 2002; Weinman, et al., 2000)
(2) Depressed MI patients were likely not to attend or dropout from cardiac rehabilitation (Fogel et al., 2004; Romanelli et al., 2002; Yohannes et al., 2007)
(3) Lower perceptions on illness control and illness severity predicted low cardiac rehabilitation attendance (Cooper et al., 1999; 2005; 2007; Petrie et al., 1996; Whitmarsh et al., 2003; Yohannes et al., 2007)
(4) Patients' concept of MI may change from acute to chronic (as found in the current study)

One could draw a picture that a better and more effective way to help MI survivors is to understand what kinds of illness perceptions they hold toward their MI, as their illness perceptions will guide their motivation to change their behaviours/lifestyles. By helping MI patients to realise whether they possess "correct" or "positive" perceptions about their illness, health professionals can tailor a cardiac rehabilitation programme to suit each individual MI patient. A recent intervention study (Petrie et al., 2002) has shed light on the benefits of modifying MI patients' illness perceptions before hospital discharge would result a lower rate of angina and a higher rate of return to work after three months post-MI. However, this intervention programme did not significantly improve cardiac rehabilitation attendance, nor did it show long-term positive effects on exercise and eating behaviours at six months (Cameron et al., 2005b). Although not all of these findings were positive, it was possible that a small sample size and other variables (i.e. demographic factors) might have prevented the detection of statistical differences between intervention group and control group.

Another possible explanation of the above finding was that these researchers (Cameron et al., 2005b) found MI patients' illness perceptions interacted with their trait negative affectivity. Those who had higher negative affectivity had lower exercise rates and higher dietary fat intake after six months. But those with low negative affectivity reported higher cardiac rehabilitation attendance and lower disability after three months. Therefore, when considering changing MI patients' illness perceptions, other variables should also be considered in order to help the patients.

Due to the negative effects of depression and anxiety on MI survivors' recovery process, medical adherence, low cardiac rehabilitation attendance and high dropout, one should also look into the treatment of negative moods when design cardiac rehabilitation programmes (DiMatteo et al., 2000; Fogel et al., 2004; French et al., 2005a; Romanelli et al., 2002; Ziegelstein et al., 2000). According to the Common Sense Model of Illness (CSMI), when human beings encounter threats/danger, they not only develop cognitive responses but emotional responses also develop in parallel with cognition. Although current findings showed positive correlations between negative illness perceptions and depression/anxiety, one could not infer any causal effects. Because the CSMI proposes illness perceptions are followed by coping strategies, appraisal and outcome and then a new process starts again, there are possibilities that negative illness perceptions will make people more depressed/anxious. It is also possible that negative emotions like depression or anxiety make one perceive illnesses in a more negative way.

Cameron et al. (2005b) also pointed out that most cardiac rehabilitation programmes try to help patients to learn more about problem-focused coping, but seldom about emotion-focused coping. If cardiac rehabilitation does not help MI patients to deal with their emotions properly, which includes giving tailored-made social support intervention to each person, those depressed MI patients who could have benefited more from cardiac rehabilitation will probably not follow professional advices or even drop out from rehabilitation.

However, treatment of post-MI depression and anxiety should be carefully designed, as Martens et al. (2006) reported that post-MI patients' depressive cognitions might differ from those of psychiatric patients. Dijkstra et al. (2002) also reported that the aetiology of post-MI depression may differ from non-cardiac-related depression.

Participation of MI patients' partners/carers or family in cardiac rehabilitation

Another neglected aspect in cardiac rehabilitation is how to help the patients' family, particularly their spouses or main carers, and how to integrate family resources with professional aids to help the patients. Maybe some health professionals will argue that this is really beyond their ability and their main job is to look after the patients, not their family as well. However, the participation of MI patients' partners (or carers) serves two functions. First, partners/carers (or family members) are the main resources for caring

and supporting patients. In relation to the concepts of illness perceptions, Leventhal et al (1986) also noted that from the representation of illness through coping planning and coping appraisal is influenced by interaction with the family and by its impact on the family unit (p.116). If carers/partners also participate in cardiac rehabilitation, it will give health professionals extra help as carers/partners can act as the "front line" to help these patients in relation to their daily life, health behaviour, and exercise, etc. For example, MI partners'/carers' participation in cardiac rehabilitation not only can encourage patients' commitment to participate (Hilscher et al., 2005), their participating in exercise also makes couples' support for each other more effective (Hong et al, 2005). In addition, it has been found that those partners who participated in exercise programmes were more confident about patients' exercise ability. This confidence not only helped them to be less distressed than those who did not join in, it also help them not to overprotect the patients.

Findings from the current study also showed that the same types of MI couples' illness perceptions significantly correlated during patients' hospitalisation. This implies couples' illness perceptions could influence each other. Leventhal et al. (1986) noted that 'every component of the illness control system from the representation of disease through the development and execution of coping to appraisal is heavily influenced by interaction with the family and by its impact on the family unit' (p. 116), as illness perceptions can influence cardiac rehabilitation attendance and lifestyle behavioural changes, it is important to clarify both MI couples' illness perceptions, and not just the patients' during cardiac rehabilitation.

Secondly, the current and previous studies have shown MI also influences family members negatively. From family systems' views (Hilscher et al., 2005; Lyons et al., 1995), any stressful events happening to a family will upset the balance of the family system. The long-term unbalanced state will probably cause family member(s) physical or mental problems and this will increase health cost. For any family which is involved in a long-term caring regimen for MI patients, it is the carers/partners of the patients who may suffer from physical or mental problems. Although the current study did not investigate MI partners' physical health states and their use of NHS services, it was clear that these partners also reported negative emotions over the first six months and the levels of their negative moods (especially negative affect) were higher than that of the patients'. Through cardiac rehabilitation, partners/carers and family will also have a chance to share their opinions with health professionals. Health professionals can help partners/carers to clarify their beliefs about MI, and also support the partners/carers

(Goldsmith et al., 2006). They can also help them to learn to support, but not control or overprotect MI survivors (Franks et al., 2006).

In order to help MI patients and their families, cardiac rehabilitation programmes should consider different issues the patients and their family may encounter. For example, although there was no strong evidence in this study, others have shown that social support and coping strategies correlated significantly with MI patients' and their main carers' psychological wellbeing (moods). In addition, although there were no consistent findings, the current also demonstrated that some types of coping strategies might indirectly influence the relationships between illness perceptions and MI patients' moods. Therefore, while focusing on how to enrich MI patients' and their carers' knowledge and modifying their illness perceptions, health professionals should also pay attention to coping strategies each individual applies and the support they perceived and desired.

12.8. Strength of the current study

Results from this study have extended one's understanding of first-time MI patients' and their spouses' emotional and perception responses during patients' hospitalisation to 6-months post-MI. It also sheds light on illness perceptions and reflects their importance on MI patients' moods.

Although this study is not the first long-term study in MI research, it is the first ever to combine several important variables which have been individually suggested from previous research. Depression, state anxiety, social support, coping and illness perceptions were considered together as important variables in relation to MI recovery. However, none of the past studies tried to examine these variables together, let alone to conduct a long-term study.

This study was also the first to consider moods, illness perceptions and the potential mediating effects of social support and coping strategies together. Although the Common Sense Model of illness (CSMI) has structured a path between illness perceptions and outcomes through coping, it has never been tested. In addition, social support is not considered in the CSMI model. Although only the total perceived social support showed a significant correlation with the MI patients' moods, judging that social support had significant correlations with coping strategies and was often regarded as coping resources or coping assistance (Thoits, 1986), it is important to investigate its influence

on illness perceptions and moods. By adding social support into the CSMI, it provides more information about how illness perceptions could influence MI patients' recovery through social support and coping strategies.

Furthermore, this study was also designed to specifically examine the influence of desired and perceived social support on respondents' wellbeing. Most of the previous studies mainly examined total perceived support, but in this study, not only the above two perceptions were considered, the total support and three other support (special one, family, friend) were also measured.

Another contribution of this study was to take into account of the spouses' roles, and spouses' illness perceptions in relation to their moods were considered for a long period of time. Although MI patients' spouses have been examined in terms of their coping, emotions and illness perceptions, these variables were not examined together. In addition, none of the previous studies have examined MI couples at the same time to test whether they would influence each other's moods. Although neither the results in this study supported the hypotheses, nor did the MI couples show significant influences on each other, it was still important to examine the impacts of an MI event on the individual patient and their spouse. Its clinical implication will be able to help to design support/rehabilitation groups, which not only helps the patients but also the spouses or even other caregivers.

12.9. Limitations of the current study

12.9.1. Study design

There were a number of limitations in this study. First, due to the difficulty of finding suitable MI participants, a non-random sample population was used. Secondly, most MI participants were Caucasians and the majority of the patients were males. Therefore, it could not generalise current findings to other groups.

In addition to the sample size of patients, there was also a problem on the small number of MI spouses, as only 42 were willing to participate in this study and only 35 spouses completed this study. Although this was complicated by a fact that most of the current MI sufferers were widowed or single, there were other problems for recruiting and consenting spouses. For example, the majority of these first-time MI spouses needed time to look after the patients and their family. Another main reason was that most of

those spouses who turned down the research invitation felt they were not up to it, as the MI event happened suddenly and they needed time to come to terms with it. Also, it was common for the spouses to decline the invitation as the MI event had disrupted their normal routines and they were facing some financial issues. Although these reasons mentioned by the current spouses were common, it is a big obstacle which is very difficult to remove, unless more time is allowed to collect data.

Another limitation is the small percentage of female MI patients. Although several studies have presented the possible differences between male and female MI patients, including their physical recovery and emotional responses (Bogg et al., 2000; Brink et al., 2005; Dickens et al., 2004; Frasure-Smith et al., 1999; Lesperance et al., 2002; Moser et al., 2003), due to a low rate of female MI participants in this study, it was not appropriate to compare males and females. Other disadvantages include being unable to examine their differences of illness perceptions (King, 2002; Martin et al., 2004, 2005; White et al., 2007), coping (Kristofferzon et al., 2003; Martin et al., 2005; Ninot et al., 2006; Tamres et al., 2002; White et al., 2007) and the amount of perceived social support between genders. Therefore, one could not really know whether there would be gender differences with the current MI patients in relation to their illness perceptions, coping or perceived social support.

12.9.2. Methodology

There were also a number of methodology limitations which emerged in this study. First, although this study followed participants up to six months post-MI, it may not be long enough to detect long-term emotional states and illness perception changes. Considering these participants faced huge challenges both emotionally and cognitively, they would need plenty of time to adjust themselves.

Secondly, there seemed to be a problem of measuring depression, state anxiety, and negative affect. Some of these mood scores did not have a normal distribution (e.g. negative affect) and they were also highly correlated with each other. Although it was good to use different measures to examine a wider dimension of negative feelings, the selection of measures should be careful, or it may also suffer a result of conceptual overlap. Beuke et al. (2003) suggested that depression and state anxiety should be measured separately. Although the STAI is often used in MI population with good reliability and validity, Endler et al. (1992) and Kennedy et al. (2001) reported the STAI is

unable to distinguish anxiety disorders from clinical depression, and they suggested avoiding using the STAI in research where differentiating anxiety from depression is important. As a high percentage of the MI survivors reported possible elevated depressive symptoms (score over 16) at each assessment (47.3%, 35.1%, and 36.2%, respectively) in this study, it was possible that depressive symptoms might have suppressed or overlapped with anxiety symptoms. It might have been better to use a questionnaire measuring depression and state anxiety with different sub-scales to minimise the possibility of overlapping between depression and state anxiety symptoms.

Thirdly, although the patients' MI types were recorded, there was missing data in relation to their detailed medical treatments and levels of severity of heart damage (e.g., percentage of left ventricular ejection fraction - LVEF). The lack of this information made it difficult to explore whether different types of medicine (e.g., ACE inhibitor & beta-blocker) might correlate with patients' wellbeing. In addition, although past studies have reported that MI patients' depression was independent from the severity of heart damage (Lane et al., 2001ab, 2002b; Lesperance et al., 1996; Mayou et al., 2000; Parashar et al., 2006; Rieckmann et al., 2006; Schleifer et al., 1989), the lack of medical professionals' judgement on patients' physical functioning might still cause biases in the result interpretation and it might also confound patients' psychological responses or wellbeing.

In addition, the current study did not investigate the possible impact of participants' physical co-morbidity. Whilst 23.5% of the patients had hypertension and 19.3% had diabetes, there was no significant correlation between the participants' moods and these two co-morbidities. However, as diabetes mellitus and ventricular function have been found to be important to post-MI patients (Chyun et al., 2002; Tavani et al., 2002), the potential effects of co-morbidity on MI patients' moods should not be dismissed.

Another limitation was that this study only relied on self-reported measures. These results might be different from that of structured-interview or other alternatives. The participants might have 'guessed' what kinds of answers were preferred when filling in questionnaires instead of being honest. It was also possible they did not really know what they thought since their MI happened suddenly without warnings or any definite causal explanation for it. Sometimes it could be the wording of the questionnaires was unclear.

The possible problems of questionnaire wording from the original IPQ scale were further discussed here. When asked to answer questions in 'symptom identity' section, participants tended to mix up two concepts: "*what symptoms they were experiencing or observing*" and "*what symptoms they were experiencing or observing were caused by MI but nothing else*". The mixture of these two concepts in the early IPQ version was later revised (IPQ-R, Moss-Morris et al., 2002). In the IPQ-R, respondents were asked not only to identify the symptoms they've experienced but also asked whether they believe those symptoms were part of that particular illness. Although the researcher in this current study always tried to remind the respondents of the differences between these two concepts, it was not sure whether these respondents, particularly those who responded by post, had followed the rule. Therefore the results should be viewed with caution.

The IPQ symptom identity section may also have another issue. Elser (2000) reported that when comparing two types of measure frames (*endorse condition* - selecting symptoms which are experienced by participants vs. *exclude condition* - crossing out symptoms which are not experienced by participants), he found that more symptoms tended to be reported in the *exclude* condition, but participants in the *endorse* condition rated their health more negatively. In current study, four-point Likert-scale (from "never" = 0, "occasionally" = 1, "frequently" = 2 to "all the time" = 3) was used to record symptom identity. Although this design is not strictly equal to the above endorse condition, it still asked participants to select what they had experienced. Therefore, it may have the so-called "feature-positive" effect (which means that "positive occurrences of an event have more impact on attention, learning and attribution processes than non-occurrences" (Fazio et al., 1982; Jenkins & Ward, 1965; Ross, 1977) and cannot reflect what participants really experienced.

Another possible problem in the IPQ symptom identity section relates to coding and explanation. In the current study, four-point Likert-scale (from "never" = 0, "occasionally" = 1, "frequently" = 2 to "all the time" = 3) was used as the indices of numbers of symptom, frequencies of symptom occurrence and symptom severity. Although such explanations seemed logical, it may not be true, as how many symptoms and how frequent these symptoms are experienced by patients do not genuinely indicate the severity of their illness.

One problem in the original IPQ was the 'sentence tenses' used in some statements. In the three sub-scales of IPQ which measure timeline, consequences and cure/control

perceptions, two tenses (present and future) were used in those statements and the researcher often noticed that some respondents were confused at those statements which were written in a future tense. For the respondents of the current study, it seemed the present tense and future tense represent two very different time-frames and the participants could not choose an appropriate answer. For example, in the 'consequences' sub-scale one sentence stated "*my (partner's) illness will have serious financial and economic consequences*". Some respondents expressed their concerns as "*It has now, but I don't know about the future*" or "*It hasn't yet, but it may will*". These concerns surely cast doubt on the answers they had chosen.

In addition, although the IPQ causal attributions were elicited from structured items and could produce more variable meanings than open-ended measures, their relative importance was unknown in this study. Participants might also forget that they were asked to endorse the causes which were only applied to them, but not those causes which were generally accredited by health professionals. Furthermore, these structured items might induce participants to endorse more than they would have done in open-ended measures.

The original IPQ did not specifically measure illness perception of cure/control. According to the principal component analyses, 'active control' and 'passive control' sub-components were extracted for cure/control perception from the 119 MI patients. Although 119 is not a small sample size, it is probably not big enough to ensure the same component will be generalised to other MI population. However, the two new versions of IPQ (IPQ-R, Moss-Morris et al., 2002; Brief IPQ, Broadbent et al., 2006) have expanded the concept of cure/control to 'personal control' and 'treatment control'. This will help to explore more on MI patients' beliefs of cure and control of this illness.

The final limitation of the current study was not measuring the spouses' illness perceptions regarding what they thought the patients might expect of any emotional consequences in relation to the patients' own heart attack. The MI patients' spouses were only asked to answer what emotional consequences they expected for themselves. Therefore the results could not offer a bigger picture of the partners' illness perceptions toward the patients and compare the MI couples thoroughly. Finally, there was also a weakness that data of the current study, in particular with couples' data, may be over analysed, as there were very few MI couples who participated in this study.

12.10. Recommendations for future research

Future studies in MI area should follow a number of directions: first are psychological interventions and the application of theories. Secondly, one should continue to examine the model of CSMI, including the relationships of illness perceptions, social support and coping on MI patients' physical and psychological wellbeing. Other variables like personality should also be considered.

12.10.1. Research on cardiac education and rehabilitation

As the MI survival rate has increased a lot and patients are encouraged to attend cardiac rehabilitation programmes, health professionals should focus more on the design and delivery of such programmes. For future research, it is necessary to understand more about couples' moods, illness perceptions, support needs, coping strategies and the efficacy of their coping.

To ensure the success of a cardiac rehabilitation programme, future research should focus on how illness perceptions develop after MI patients' hospitalisation and what constructs of illness perceptions will motivate MI survivors and their partners/carers to participate in rehabilitation, in complying with health professionals' advices and whether their influences will change at different stages. Results from the current study have shown that MI patients and their partners formed their own illness perceptions at the early stage during hospitalisation and most of the components remained stable over time. This implies the importance of understanding these components and early intervention to help them to obtain correct and positive illness perceptions. Although questionnaires are easy to use, information gathered by scales may not be sufficient. Qualitative information should be also collected through interviews, or, as suggested by Cameron & Nicholls (1998) and Shifren (2003), through personal narrative techniques to address the development of couples' illness representations. It is also important to investigate how to alter illness perceptions to be more positive and beneficial to MI survivors and their family.

In addition, future research should look at what causes are attributed by MI patients and partners, why they attribute those causes and whether they focus on one particular cause or multiple causes. Although health campaigns have been launched to educate people about the risk factors of MI, some studies still reported only a small percentage of cardiac patients could correctly point out what factors have probably caused their illness

(French et al., 2005b; Fukuoka et al., 2004; Murphy, et al., 2005; Zerwic et al., 1997). Besides, some patients may regard MI as an acute event triggered by some specific factors such as stress or anger, instead of realising its underlying long-term causes. Wrong causal attributions may make patients unable to recognise the importance of rehabilitation and long-term lifestyle management.

According to Gregory et al. (2006), after attending cardiac rehabilitation, most patients agreed that it is difficult to adhere to health professionals' advices after finishing the programme. Although cardiac rehabilitation patients often report strong intentions to do regular exercise, there is a discrepancy between their intentions and subsequent exercise behaviours (Johnston et al., 2004). Future research should investigate what factors could influence this and what health professionals can do to help MI survivors not only get used to more beneficial lifestyles but also enjoy themselves, so these lifestyles can truly become part of their everyday lives.

In addition, since one of the keys to managing chronic illnesses is the appropriate use of medicine, MI patients' treatment belief should also be considered in cardiac rehabilitation. Horne & Weinman (1999; 2002) have reported the importance of treatment beliefs (including medicine taking and treatment options) in different medical groups (cardiac, asthma, renal and oncology). Llewellyn et al. (2003) also reported the belief of treatment necessity was related to treatment adherence in haemophilic patients. Hirani & Newman (2005) also suggested incorporating the treatment beliefs as part of cardiac patients' cognition related to their illness. It is therefore important to further examine the concepts of patients' treatment beliefs in relation to cardiac rehabilitation and patients' progresses.

Researchers should also examine the perceptions of personal control in relation to the success of cardiac rehabilitation. Although the concepts of illness control and personal control have both been linked with cardiac patients' recovery, the relationship between these two and how personal control influences MI patients' cardiac rehabilitation progress are unknown. In addition, researchers and health professionals should also examine MI survivors' expectations of control in relation to their illness and to their life. Although to some patients, the onset of MI may be a one-off event, the long-term control and maintenance of their heart conditions still means MI is a chronic disease. Since MI is chronic, a committed involvement in medical treatments and healthy lifestyles cannot guarantee patients' total control over its outcomes (e.g., another MI or other cardiac complications). Therefore, researchers should try to understand when ultimate outcomes

cannot be controlled, what kinds of outcome expectancy (e.g., symptom management) may give them a stronger sense of control.

Past studies have also reported high self-efficacy positively correlated with cardiac patients' compliance to exercise regimens (Ewart, 1992; Jeng & Braun, 1997). As self-efficacy is the belief about one's capabilities of performing specific behaviours in specific situations (Bandura, 1977; 1997), in the context of cardiac rehabilitation, MI patients' self-efficacy could represent their beliefs of being able to adopt and maintain healthy behaviours. Based on the findings that illness perceptions predicted cardiac rehabilitation attendance and self-efficacy linked to exercise behaviour, it would be important to investigate the relationship between these two variables. Lau-Walker (2004) reported that illness perceptions and self-efficacy significantly correlated and later suggested (Lau-Walker, 2006) that illness perception components predict self-efficacy and proposed an integrated care model. Future research may follow this proposal and further examine its application to rehabilitation.

In terms of social support, although the positive role of social support was not strongly recognised in this study, it does not make social support less important. On the contrary, future studies should continue to investigate the possible positive and negative impacts of social support on MI patients and their partners/carers. Key issues should focus on what types of support are most needed or unwanted from MI patients at different stages, as MI patients and their partners/carers may face different difficulties/tasks at different stages of MI recovery. Meanwhile, because perceived social support is regarded as more important than received support, future work should continue to look at the gap between them and how received support is perceived. It is possible that the way received support is delivered and the communication between receivers and supporters influences receivers' perception about the support they received. Therefore, how MI patients' communicate with their partners/carers should also be examined.

Future research on cardiac rehabilitation should continue to focus on 'coping strategies'. Researchers tend to agree that problem-focused coping is more useful than emotional-focused coping when an adverse event happens. However, past studies have shown that using denial coping at the acute phase of a cardiac onset may be beneficial to patients. The current study also found that those patients who used more 'planning coping' reported a stronger negative affect. These findings indicated the complexity of coping strategies. Due to its dispositional and situational characteristics, research in cardiac rehabilitation probably should look at the relationship of specific coping strategies

with MI patients' and partners'/carers' recovery at different recovery stage, and how coping strategies change over time.

Although the above variables have significant relationships with MI rehabilitation, one cannot deny the possible relationships between them. Therefore, researchers should examine the inter-relationship between these variables in the future.

12.10.2. Methodology improvement

Although it is difficult to gather enough MI patients for research, in order to generalise research findings to other cardiac patients, it is preferable to have a larger sample size with more female participants. In longitudinal design, the follow-up duration should be longer than six months in order to detect information which may be related to different periods of time. In addition, for the intervention designs, randomisation and control groups should also be included.

Although the original IPQ was widely used after its publication, there was also criticism of it. Some of the problems have already been discussed in the limitation section. Others have been reported that "cure/control" and "timeline" had internal consistency problems (Moss-Morris et al., 2002). To overcome the criticism, A revised IPQ questionnaire was published in 2002 (Moss-Morris et al., 2002). This IPQ-R extended the original scale to 80 items and measures more sub-dimensions of illness perceptions. For example, three new sub-dimensions are added (cyclical timeline, illness comprehension, and emotional representation). However, as the IPQ-R measures illness perceptions in more depth, it also takes more time. For those who are seriously ill or elderly, it can be a burden to answer these questions. In 2006, the second revised IPQ was published and it has shortened the IPQ-R to a brief-IPQ (Broadbent et al., 2006). Although there are only nine items, it claims to measure illness causes, consequences, timeline, control (personal & treatment), identity, emotion representations (concern & emotions) and illness comprehensibility with good reliability and validity.

The above two revised IPQ can match researchers' different needs. The IPQ-R provides detailed information and can be more sensitive to changes of illness perceptions. The brief-IPQ offers simple but clear interpretations in a short time and will not increase the burden on research participants. For future studies, these revisions provide more options

and also increase the possibility for researchers to use both questionnaires and interviews to gather participants' illness perceptions.

In their recent study, French and colleagues (2005d) mentioned that past studies using principal component analysis to extract factors of illness perceptions (e.g., Affleck et al., 1987b; Senior et al., 1999; Weinman et al., 2000) may suffer from inflating the estimates of component loading. They suggested that other methods of factor analysis (e.g., common or principal axis) should be used. Principal component analysis is often used in psychological research to extract factors because of its sound psychometrical procedure and less complex concepts than factor analysis. However, it only establishes which linear components exist within the data and how a specific variable may contribute to that component (Dunteman, 1989). Although some researchers (Gaudagnoli & Velicer, 1988) have argued the solutions generated from principal component analysis and factor analytic techniques differed little, future research should probably try to use other techniques rather than relying on principal component analysis.

Several researchers have used spontaneous, elicited, cued (Gudmundsdottir et al., 2001), explicit questionnaire, implicit vignette task and network analysis (French et al., 2002; 2003) to study causal attributions of MI. There is still no consensus about which method is preferable and future work should continue to examine different methods of examining MI patients' causal attributions.

Regarding coping measures, more efforts should be made to distinguish coping strategies and coping effectiveness. According to the CSMI, cognitive and emotional representations develop in parallel before coping actions are taken, then coping is appraised and the feedbacks will lead to modifications of representations. Although the concept of coping effectiveness is not mentioned in the CSMI, the appraisal process should include this. Therefore, it is important to distinguish what types of coping strategies MI patients often use and to what extent they are satisfied with these coping strategies. If researchers can help MI patients to distinguish the differences between coping strategies and coping effectiveness, it will be easier for MI patients to understand that not all coping strategies they use will benefit them, and by identifying what strategies help and those which don't, they can learn to cope more efficiently.

Future research should also examine personality together with illness perceptions, social support and coping strategies. As Thoits (1995) mentioned, sociologists typically assume personality is shaped and modified by life experiences, therefore personality not only

influences perceptions and coping behaviours, the success or failure of coping results will also enhance or undermine personality. Some studies have reported personality traits such as optimism or hostility could directly or indirectly influence cardiac patients' coping strategies (Bedi & Brown, 2005; Shen et al., 2004). However, it is still unknown whether personality will influence patients' illness perceptions toward their MI. The CSMI proposes that social-cultural context influences people's perceived self, which is influenced by their biological characteristics, psychological traits and coping preferences (Leventhal et al., 1982, 2001), and these factors will influence the whole process of a person's perception of their illness, how they approach it and their emotional/physical outcomes. However, the concepts of the social-cultural context, biological, psychological factors and coping preferences are not discussed in details in the CSMI. As mentioned in the section related to the mediating effect of coping and social support, this model also uses a broad concept of coping to link with illness perceptions and emotional outcomes. Therefore, it is important to take into account personality when examining the relationship of illness perceptions, social support, coping and MI patients' moods. Other psychological factors including self-efficacy and personal control should also be examined in the future research.

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APPENDIX A – MEASURE TOOLS AND METHODS

Appendix A-1. Article selection criteria for literature review

Literature review	Contents
Data base	PsycInfo, Medline, BIDS
Publication year	1972 – 2006 (updated to 2007 for amendments)
Key words/phrases for MI	Myocardial infarction, MI, heart attack, heart disease(s), coronary artery disease(s), coronary heart disease(s), heart disease(s), first-time, first
Key words/phrases for depression	Negative mood(s), depression, depressed
Key words/phrases for anxiety	Negative mood(s), anxiety, anxious
Key words/phrases for illness perceptions	Illness perception(s), illness representation(s), illness cognition(s), illness belief(s), common-sense model of illness, social cognition (models), self-regulation
Key words/phrases for coping	Coping, coping strategy, coping strategies
Key words/phrases for social support	Social support, social network, emotional support, instrumental support, informational support, perceived support, received support, support expectation(s), desired support, social isolation
Key words/phrases for MI couples	Couple(s), spouse(s), partner(s), wife (wives), husband(s), care-giver(s), marriage, married-couple(s)
Selection criteria for articles	Sample description: sample size, mean age and/or age range, numbers of males/females Medical information: medical definition of MI, or confirmed MI from medical charts Qualitative study – include clearly defined coding and categorisation methods Quantitative study – use standardised questionnaires or structured interviews, control possible confounding variables

Ps. Key words for MI were also combined with key words for depression, anxiety, illness perceptions, social support, coping and couples

Appendix A-2. Recruitment criteria of MI patients and partners

Recruitment criteria	MI patients	MI patients' partners
1	First-time MI	X
2	Patients have experienced at least two of the three medical criteria: A typical ischemic chest pain lasting more than fifteen minutes; Elevated cardiac enzymes (a peak creatinine phosphokinase (CK) level greater than 1.5 times of the normal limit, or a CK-MB (the myocardial isoenzyme of CK) value exceeding the normal limit); The presence of new pathological Q-waves on the electrocardiogram.	X
3	No previous angioplasty, congenital heart disease, primary valvular heart disease or substance dependence	X
4	Absence of other major ongoing physical illnesses, history of cognitive impairment, psychopathology or suicidal risks (that could influence current MI treatment and recovery)	√
5	Adequate command of spoken and written English	√

Appendix A-3. Patients' information sheet

Patient Information Sheet: An invitation to take part in research

Title of study: Examining patients' beliefs and moods after their heart attack

Study sites: The Whittington Hospital, London

Investigators: Professor Stanton Newman (UCL), Dr. Suzanna Hardman (UCL), Ms Ann Brereton (UCL), Ms Shu-Tsen Tseng (UCL)

Further information: Ms Shu-Tsen Tseng (Tel: 0171-5049421; pager NO: 01426-133559)

We would like to invite you to take part in a research study administered by researchers from UCL. This information sheet will explain why and how the study is being carried out.

What is this study for?

Dealing with a heart attack can be difficult for many patients. The purpose of this study is to look at your views and feelings toward your heart attack and their influences on your recovery. *Your own experiences with a heart attack are of crucial importance* for understanding the effectiveness and adequacy of our current service.

What are the benefits of this Study?

We hope that the information produced by this study will lead us to understand patients' feelings and thoughts about their heart attack and improve existing services for heart attack patients in the future.

What will happen if you take part in the study?

You do not have to take part in this study unless you want to. If you decide to take part, you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not effect your care and management in any way.

If you take part in the study, you will be given a consent form to complete. A principal researcher, Ms Shu-Tsen Tseng, will come to see you and administer the questionnaires, and she will be available for you to ask any questions or clarify any of the questionnaires.

There will be four occasions we would like you to complete questionnaires:
The first assessment will be taken when you are in the hospital. Your feelings and thoughts about your heart attack will be the ones we are interested in. It will take about 45 minutes.

From the second assessment onward, we would like to know more about your daily activities and thoughts related to your illness and treatment. Each time will take about 60-75 minutes for you to complete the questionnaires. Shu-Tsen will contact you every time when the remaining assessment draws near.

Confidentiality or Records
We need your permission to access the parts of your records that relate to the study. You are assured of complete confidentiality in all information you may give. We will be adhering to local and national data protection laws.

The information collected during the study, except your name, will be stored and analysed confidentially in a computer. Only the researcher will know that the information is related to you.

The results of the study may be published in the medical literature, but your name and details will not be revealed.

Please note:
All proposals for research using human subjects are reviewed by the Whittington Committees on Ethics of Human Research.

Appendix A-4. Patients' consent form

Confidential

AGREEMENT TO PARTICIPATE IN THIS RESEARCH PROJECT

Title of Study: Examining patients' beliefs and moods after their heart attack

Investigators: Professor Stanton Newman
Dr. Suzanna Hardman
Ms Ann Brereton
Ms Shu-Tsen Tseng

To be completed by the participant	Delete as necessary
1. Have you read the information sheet about this study?	YES/NO
2. Have you had the opportunity to ask questions and discuss the study?	YES/NO
3. Have you received satisfactory answers to all your questions?	YES/NO
4. Have you received enough information about this study?	YES/NO
5. Which doctor have you spoken to about this study?	....
6. Do you understand that you are free to withdraw from this study	
* at any time	
* without giving a reason for withdrawing	
* without affecting your future medical care?	YES/NO
7. Do you agree to take part in this study?	YES/NO

Signed.....Date.....

Name in Block Letters: .....

Doctor.....

Appendix A-5. Spouses' information sheet

Confidential

Participant's Information Sheet: An invitation to take part in research

Title of study: Examining patients' beliefs and moods after their heart attack
Study sites: The Whittington Hospital, London Investigators: Professor Stanton Newman (UCL), Dr. Suzanna Hardman (Whittington and UCL), Ms Sharon Murphy (Whittington), Ms Shu-Tsen Tseng (UCL) Further information: Professor Newman (Tel: 020-76799476) or Dr. Hardman (020-7288-5290/92)

We would like to invite you to take part in a research study run jointly by the Cardiology Unit and administered by researchers from UCL. This information sheet will explain why and how the study is being carried out.

What is this study for?

Dealing with a heart attack can be difficult for many patients and their partners. The purpose of this study is to look at your views and feelings toward your partners' heart attack and the influences on their recovery. *Your own experiences with your partner's heart attack are of crucial importance* for understanding the effectiveness and adequacy of our current service.

What will happen if you take part in the study?

If you decide to take part in the study, you will be given a consent form to complete. A principal researcher, Ms Shu-Tsen Tseng, will come to see you and take you through the questionnaires. She will be available throughout this time for you to ask any questions.

We would like you to complete questionnaires on three occasions:

The first assessment will be taken while your partner is still in the hospital. The second time will be taken 4-6 weeks after your partner's discharge, and the final assessment will be 6 months after the discharge. Your own feelings and thoughts about your partners' heart attack will be the ones we are interested in. The assessment for each time will take about 40 minutes.

We will try and organise these at a time convenient to you. You will be contacted before each You do not have to take part in this study unless you want to. If you decide to take part, you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not effect in any way the care and management your partner receives.

What are the benefits of this Study?

We hope that the information produced by this study will lead us to have a greater understanding of patients' and their partners' feelings and thoughts about having a heart attack. This will enable us to improve existing services for heart attack patients and their partners in the future.

Confidentiality or Records

You are assured of complete confidentiality in all information you may give. We will be adhering to local and national data protection laws.

The information collected during the study, except your name, will be stored and analysed confidentially in a computer. Only the researcher will know that the information is related to you.

The results of the study may be published in the medical literature, but your name and details will not be revealed.

Please note:

All proposals for research using human subjects are reviewed by the Whittington Committees on Ethics of Human Research.

Appendix A-6. Spouses' consent form

Confidential

AGREEMENT TO PARTICIPATE IN THIS RESEARCH PROJECT

Title of Study: Examining patients' beliefs and moods after their heart attack

Investigators: Professor Stanton Newman
Dr. Suzanna Hardman
Ms Ann Brereton
Ms Shu-Tsen Tseng

To be completed by the participant	Delete as necessary
1. Have you read the information sheet about this study?	YES/NO
2. Have you had the opportunity to ask questions and discuss the study?	YES/NO
3. Have you received satisfactory answers to all your questions?	YES/NO
4. Have you received enough information about this study?	YES/NO
5. Which doctor have you spoken to about this study?	....
6. Do you understand that you are free to withdraw from this study	
* at any time	
* without giving a reason for withdrawing	
* without affecting your partner's future medical care?	YES/NO
7. Do you agree to take part in this study?	YES/NO

Signed.....Date.....

Name in Block Letters: .....

Doctor.....

Appendix A-7. Estimated sample size, power and effect size

Statistical Tests	Number	Power	Effect Size (medium)
t-test (mean)	102 (1-tailed)	0.80	d = 0.5
t-test (correlation)	64 (1-tailed)	0.80	r = 0.3
One-way ANOVA (2 groups)	120	0.80	f = 0.26
One-way ANOVA (3 repetitions)	120	0.80	F = 0.29
Multiple regression (10 predictors)	120	0.85	$f^2 = 0.15$

Appendix A-8. Questionnaire Reliability

Measures	Time 1 (3rd-5th day in hospital)	Time 2 (4-8 weeks after MI)	Time 3 (6th month post MI)
Psychological wellbeing -			
1. Depression	♠ (0.88) Δ (0.91)	♠ (0.90) Δ (0.94)	♠ (0.79) Δ (0.93)
2. Positive & negative affect	♠ (P: 0.81; N: 0.91) Δ (P: 0.77; N: 0.75)	♠ (P: 0.87; N: 0.88) Δ (P: 0.84; N: 0.94)	♠ (P: 0.89; N: 0.88) Δ (P: 0.92; N: 0.92)
3. State anxiety	♠ (0.80) Δ (0.88)	♠ (0.82) Δ (0.90)	♠ (0.86) Δ (0.86)
Physical functioning –			
1. Leisure activities	---	♠ (0.75 - 0.87)	♠ (0.72 – 0.83)
2. Subjective health	---	♠	♠
Personality -			
1. Hostility (cynicism)	♠ (0.82)	♠ (0.83)	♠ (0.85)
2. Trait anger	♠ (0.83)	♠ (0.88)	♠ (0.80)
3. Optimism	---	♠ (0.53)	♠ (0.71)
4. Trait anxiety	---	♠ (0.93)	---
Illness representation	♠ (cause: 0.59 – 0.89 (cognition: 0.62 – 0.79) Δ (cause: 0.34 – 0.79) (cognition: 0.19 – 0.76)	♠ (cause: 0.55 – 0.88) (cognition: 0.34 – 0.75) Δ (cause: 0.38 – 0.85) (cognition: 0.33 – 0.75)	♠ (cause: 0.61 – 0.87) (cognition: 0.45 – 0.76) Δ (cause: 0.45 – 0.85) (cognition: 0.18 – 0.73)
Social support -			
1. Types and total support	---	♠ (0.88 – 0.95) Δ (0.85 – 0.94)	♠ (0.93 – 0.94) Δ (0.95 – 0.97)
2. Perceived & desired support	---	♠ Δ	♠ Δ
General Self-efficacy	---	♠ (0.90)	♠ (0.87)
Cardiac Self-efficacy	---	♠ (0.90)	♠ (0.89)
Coping	---	♠ (0.84) Δ (0.89)	♠ (0.85) Δ (0.87)
Marital satisfaction	---	♠	---
Self-designed questionnaires			
1. Co-morbidity	---	♠	♠
2. Health-related behaviour	♠	---	♠
3. Demographic/medical data	♠ Δ	---	---
4. Attendance to rehabilitation	---	---	♠

♠ patients Δ partners/spouses

Appendix A- 9. Review of MI patients' depression prevalence from cross-sectional studies

Authors	1st MI or not	Sample	Depression measure	Cut-off criterion	Measure time	Mean depression and clinical depression (%)
Before discharge						
Barry et al (2007)	Mixed (19.8% > 1 MI)	1847 (68.8% males) No age limit Age = 60.6 ± 12	PHQ-9	0-4: no clinical depression 5-9: mild 10-14: moderate 15-19: moderately severe depression ≥ 20: severe depression	In-hospital	46% score ≥ 4 2.3% score ≥ 20
Berkman et al (1992)	Mixed (35% > 1 MI)	194 (51% men) Age limited > 64	CESD	CESD ≥ 16	In-hospital	17% scored ≥ 16
Bush et al (2001)	Mixed (30% > 1 MI)	267 (58% men) T2 age = 64.8 ± 11.8 17.7% with depression history	SCID for mood disorder BDI	DSM-III for SCID BDI ≥ 10	hospitalisation (2-5 days)	17.2% had mood disorders with DSM-III 19.9% with depressive symptoms (BDI ≥ 10) Total mood disorder and/or BDI ≥ 10 were present in 27.3%
Carney et al (2003)	Mixed (21% > 1 MI)	766 (60.4% men) Depressed = 56.76 ± 12.7 Non-depressed = 60.89 ± 10.91	1. DISH interview 2. BDI	1. professional judgement 2. BDI ≥ 10	28 days hospitalisation	46.7% were depressed (21.3% major and 25.4% minor depression)
Chemington et al (2004)	unknown	49 (49% men) age = 60.8 ± 13.32	BDI	BDI: 14-19: mild 20-28: moderate 29-63: severe	24 – 48 hrs in hospital	Mild = 8 (16.3%) Moderate = 3 (6.1%) Severe = 3 (6.1%) No depression = 35 (71.4%)
Crowe et al (1996)	Mixed (16% > 1 MI)	785 (87% men), mean age = 61	Short BDI (13 items)	Short BDI ≥ 5 mild ≥ 8 moderate to severe	3 days hospitalisation	543 (69%) scored ≥ 5. 72 (9%) scored ≥ 8 Demographic data had no relationship to anxiety and depression
Feuerbach et al (2005)	Mixed (24% > 1 MI)	196	BDI SCID interview	BDI ≥ 10	2-5 days in hospital	44 (22.4%) depressed, Of whom 26 matched SCID criteria and 33 scored BDI ≥ 10
Fogel et al (2004)	Mixed (30.7% > 1 MI)	285 (57.2% men)	BDI	BDI ≥ 10	2-5 days in hospital	19.6% ≥ 10
Frasure-Smith et al (1993,1995ab)	Mixed (37% > 1MI)	222 (76% men) Mean age = 60 (26.8% with previous depression)	1. DIS for major depression 2. BDI for depressive symptom	1. DIS: DSM-IIIR 2.BDI ≥ 10	5-15 days in hospital	1. DIS – 15.8% with major depression 2. BDI – 31..2% had depressive symptoms
Frasure-Smith et al (2000a)	Mixed (32.3% > 1 MI)	848 (68.8% men)	BDI	BDI ≥ 10	Hospitalisation	260 (30.7%) were depressed
Frasure-Smith (2000b)	mixed	887	BDI	BDI ≥ 10	7 days in hospital	284 (32%) were depressed
Frasure-Smith et al (1999), Lesperance et al (2002)	Mixed (23.6% > 1 MI)	896 (68.4% men) age = 59.4 ± 11.2	BDI	BDI ≥ 10	Hospitalisation	37.4% < 5 30.3% scored 5 - 9 23.5% scored 10 – 18 8.8% scored > 18 In total, 32.3% score > 9 Ps. Women: 47% (mean = 11.3 ± 9.3) Men: 25.6% (mean = 7.1 ± 7.1)
Kamm-Stegelman et al (2006)	unknown	59 women age = 52.8 ± 8.48 (36-64)	BDI-II	BDI: Normal: 0 - 14 Mild: 14-19 Moderate: 20-28 Severe: ≥ 29	On the day of discharge	29 (49%) had mild to severe depression
Kaufmann (1999)	Mixed (23% > 1 MI)	331 (65.6% men) age = 65 ± 12.1 (4% with depression history)	DIS interview	DIS ≥ 5	3 – 15 days hospitalisation	90 (27.2%) had clinical depression
Mallik et al (2006)	Mixed (21.5% > 1 MI)	2496 (67.4% men) (6% had depression history)	PHQ-9	PHQ ≥ 10	0-53 days hospitalisation	Overall, 22.3% were depressed. Of men, 19.1% were depressed. Of women, 29.1% were depressed. Ps. Younger age, women, single, lower social support and low SES, and more co-morbidities (history of AMI, congestive heart failure, diabetes) were associated to higher depression. Overall, logistic model showed young women with low SES, behavioural factors and medical history (age < 60) had the highest depression rate (40%)
Romanelli et al (2002)	Mixed (36% > 1 MI)	T1: 153 (55.6% men) Age > 65 Mean age = 74.5 ± 1.2 T2: 101	1. BDI 2. SCID interview	1 BDI ≥ 10 2. SCID: interview based on DSM-III-R	T1: 3 – 5 days hospitalisation T2: 4 months post-MI	35 (22.9%) were depressed (combined 27 patients with BDI > 9 and 21 patients with positive SCID results. 13 patients had both)

BDI: Beck Depression Inventory; CESD: Centre for Epidemiological Studies Depression-Scale; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HRDS: Hamilton Rating scale for depression Scale; MADRS: Montgomery-Asberg Depression Rating Scale; MDI: Major Depression Inventor; PHQ-9: Patient Health Questionnaire; SCID: Structural Clinical Interview for DMS; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder, 3rd SRDS: Zung's Self-Rating Depression Scale

(continued)

Authors	1st MI or not	Sample	Depression measure	Cut-off criterion	Measure time	Mean depression and clinical depression (%)
Before discharge						
Silverstone et al. (1990a)	mixed	100	MADRS	Mild: ≤ 7 Moderate: 8 – 20 Severe: >20 (sometimes use 7 – 19 = mild; 20 – 34 = moderate)	Hospitalisation	If using cut-off = 7: 59% depressed Cut-off = 14: 41% Cu-off = 21: 19%
Sorensen et al. (2006)	Mixed (15% > 1 MI)	761 (76% men) Age limit < 76	MDI	Unknown	At discharge (mean 7 days)	Total 9.6% were depressed (37 men and 36 women were depressed) Women were more depressed (19.6% vs. 6.4%)
Spijkerman et al. (2006)	Mixed (13.6% > 1 MI)	494 Age = 60.5 ± 11.7	BDI	BDI ≥ 10	In hospital – 227 After discharge – 267 (1-68 days)	117 (23.7%) were depressed
Watkins et al. (2003)	Mixed (17% > 1 MI)	2481 (56% men) Age = 61 ± 13 (20 – 97)	1. BDI 2. DISH & HRSD (17 items)	1. BDI: Minor : 10 - 18 Major: ≥ 19 2. HRSD: Minor: 14 – 17 Major: ≥ 18	28 days hospitalisation	35% minor depression and 38% major depression
Ziegelstein et al. (2005)	unknown	60 (60% men) age: 66.5 ± 12.8	BDI	BDI ≥ 10	2-5 days hospitalisation	18 (30%) scored higher than 10 More depressed patients were women (p = 0.03) Ps. Medical professionals underestimated MI patients' depression
After discharge						
Denollet & Brutsaert (1998)	Mixed (26.7% 1 MI)	87 (93% men) Age = 55.1 (41-69)	Millon Behavioural Health Inventory (Millon et al., 1982)	Both 'pessimism' and 'despair' subscales > median scores;	3-6 weeks post-MI	44 (50.6%) had depression
Denollet et al. (2006)	unknown	176 (76% men) Age = 60.1 ± 10.7	1. BDI 2. SCL-90 3. HADS 4. Symptoms of Anxiety-Depression index (Denollet et al., 2006) 5. SCID interview & HRDS	BDI ≥ 10 HRDS > 17	1 month post-MI	31 (18%) had co-morbidity depression 37 (21%) had depressive *or* anxiety disorder Ps. Mixed anxiety-depression was present in 90% of depressed MI patients and in 100% of severely depressed patients
van Melle et al. (2007)	mixed	2177	1. BDI 2. CIDI	BDI ≥ 10	3 months post-MI	Of those BDI ≥ 10, 375 (17.2%) met ICD-10 criteria for depression
Before discharge						
Gilutz (1991)	Yes	186 (87 Israeli & 98 Swedish)	Holland Sgroi Anxiety Depression Scale & the Hackett-Cassum Denial Scale (Froese, 1974)	unknown	Hospitalisation	Swedish – 42.9% non-depressed; 45.9% mild depressed; 11.2% moderate/severe depressed Israeli – 34.5% non-depressed; 31% mild depressed; 34.7% moderate/severe depressed
After discharge						
Bennett (1999b)	Yes	43 men Age < 75 men age = 65 ± 8.2	HADS	HADS ≥ 8	Post discharge	24% men had depression (29% wives had depression)
Bjerkeset et al. (2005)	Yes	512 (71.8% men) Mean age = 56.2	HADS	HADS ≥ 8	2- 5 years after MI	Women: had MI within 2 years – 26.4% were depressed; women had MI between 2-5 years – 13.7% were depressed Men: had MI within 2 years – 18.9% were depressed; had MI 2-5 years – 21.8% were depressed. Ps. Women were older
Strik et al. (2001)	Yes	206 (75.7% men) age (M) 59 ± 10.6 age (F) 62.9 ± 10.7	1. SCID interview 2. BDI 3. HADS 4. HRSD	X	1 month post-MI	Based on SCID: 23 (M =13, F = 10) for major depression (11.1%) 16 (M = 12, F = 4) for minor depression (7.8%) Overall 18.9% of 206 patients had minor to major depression
Strik et al. (2003)	Yes	318 men age 58 ± 11	SCL-90 (16 items for depression)	SCL-90 ≥ 23	1 month post-MI	47.1% had depression
Watkins et al. (2000)	Yes	275 (83.6% men) Age < 65	SRDS	SRDS ≥ 40	1-month post-MI	36% were depressed
White et al. (2007)	Yes	27 women Age = 60.7 ± 15.38	BDI	BDI: Mild to moderate: 10-18: Moderate to severe: 19-29 Severe: > 29	Mean = 11 months (1 week to 35 months post-MI)	10 (37%) normal 11 (41%) mild to moderate 2 (7%) moderate to severe depression 4 (15%) < 5

BDI: Beck Depression Inventory; CESD: Centre for Epidemiological Studies Depression-Scale; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton; HADS: Hospital Anxiety and Depression Scale; HRDS: Hamilton Rating scale for depression Scale; MADRS: Montgomery-Asberg Depression Rating Scale; MDI: Major Depression Inventor; PHQ-9: Patient Health Questionnaire; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder; SCL-90: Symptom Check List-90; SRDS: Zung's Self-Rating Depression Scale

Appendix A- 10. Review of MI patients' depression prevalence from longitudinal studies

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Depression prevalence & stability
Barefoot et al. (2003)	Mixed (25% > 1 MI)	T1: hospitalisation T2: 2 weeks later	T1 & T2: 196 (63% men) 35% with depression history Mean age = 60.8	1. BDI (10-15 = minor, 16-23 = moderate, 24-63 = severe)	BDI - T1: 37% ≥ 10. T2: 27% ≥ 10 (27% improved, 13% worsened, 59% remained depressed from T1) Mean BDI decreased significantly ($p < 0.001$)
				2. HRSD (unknown cut-off)	HRSD - T1: 28%; T2: 17% (75% remained depressed from T1 , 16% improved & 9% became more depressed) Mean HRSD decreased significantly ($p < 0.003$) Ps. BDI and HRSD had fair to moderate agreement Old age significantly correlated with less depression
Boersma et al (2005)	unknown	T1: 2-5 weeks post-discharge T2: 4 months after T1	113 (74.3% men) Age < 70 mean age = 54.1 ± 10.3	Dutch version HADS (Spinhoven et al., 1997) ≥ 8 for possible clinical depression	T1: 14% depressed T2: 10% remained depressed (Mean depression score as not higher than the general population)
Brummett et al (1998)	unknown	T1: in hospital T2: 1 months after T1	T1: 620 T2: 506 (68.2% men) Age = 63.4 ± 11.4 (36-93)	CESD ≥ 16	Mean depression score decreased ($p = 0.001$) T1 depression significantly predicted T2 depression T1: depression = 15.66 ± 11.37 (prevalence: 215/620 = 34.7%) T2: depression = 11.21 ± 8.79 (prevanelce: 137/506 = 27.1%) Of 506 MI patients (at T2), 78 (15.4%) were depressed at T1 and T2 137 (27.1%) were depressed at T1 only 59 (11.7%) were depressed at T2 only 232 (45.8%) were never depressed Ps. Women reported more depressive symptoms ($p < 0.001$)
Crowe et al (1996)	mixed (17% > 1 MI)	T1: 3 days in hospital T2: 1 year after	201 (88% men).	Short BDI ≥ 5 mild ≥ 8 moderate	Mean BDI decreased from 4 to 3 by 14 weeks and then remained stable till 1 year. 20 (10%) patients had moderate to severe depressive symptoms during this time. Demographic data had no relationship to anxiety and depression
De Jonge et al (2006a)	Mixed (14.3% > 1 MI)	T1: in hospital T2: 3 months post-MI T3: 6 months T4: 12 months	421 (43.4% of depressed MI had pre-MI depression)	T1: BDI (0-9, 10-19, 20-29, > 29 T2: CIDI (Wittchen, 1994)	Based on CIDI: 106 (25.5%) out of 421 had post-MI depressive disorder during the post-MI year. Of them, 77 (72.6%) had mild depression, 20 (18.9%) had moderate depression and 9 (8.5%) had severe depression based on BDI For 39 (36.8%) the episode lasted less than 3 months, for 49 (46.2%) it lasted 3-9 months and for 18 (17%) it lasted for more than 9 months. 36 (34%) out of 106 were depressed from T1 to T4
De Jonge et al (2006b)	Mixed (18.8% > 1 MI)	T1: in hospital T2: 3 months post-MI T3: 6 months T4: 12 months	468 (55.4% had depression before MI)	T2 & T4: CIDI (Wittchen, 1994)	119 (25.4%) had a depression during the post-MI year. Of whom 53 (44.5%) were new cases and . 66 (55.4%) have had pre-MI depression
Frasure-Smith et al (1993,1995ab) Leeperance et al (1996)	Mixed (37% > 1 MI)	T1: 5-15 days in hospital T2: 6-months post-MI T3: 12-months post-MI	T1: 222 (78% men, 26.8% with previous depression) T2 – T3: 170	DIS – DSM-III-R BDI ≥ 10	T1: 15.8% (35/222) had major depression; 30.6% BDI ≥ 10 T2: 20.6% (35/170) became depressed between T1 – T2 T3: 3% (5/170) became depressed between T2 – T3
Frasure-Smith et al (2000b)	unknown	T1: 7-days post-MI T2: 1-year post-MI	T1 & T2: 887	BDI ≥ 10	T1: 32% depressed T2: those depressed at T1 had a significant decline at T2 for about 5 points. The non-depressed at T1 had an increase of 1 point ($p < 0.0001$)
Havik & Maeland (1990)	unknown	T1: 9 days after admission T2: before discharge T3: 1-2 weeks post discharge T4: 6-weeks post-discharge T5: 6-months post-discharge T6: 3-5 year post discharge	T1: 383 T2 – T6: 283	SED (Havik, 1982, Range 4 – 28), ≥ 15	T1: 19% depressed T2: 13% depressed T3: 26% depressed T4: 22% depressed T5: 19% depressed T6: 18% depressed T1 – T6 – average depression score decreased at T2, but increased at T3. Then it remained similar to the level of T2 until T6
Kaptein et al (2006)	unknown	T1: hospitalisation T2: 3-months post-MI T3: 6-months post-MI T4: 12-months post-MI	475 (81% men) mean age = 60.6	T1 to T4: BDI ≥ 10 T2 and T4: CIDI interview	T1: 22.7% depressed T2: 23.8% depressed T3: 25.5% depressed T4: 24.8% depressed The presence of significant depressive symptoms was stable If based on BDI > 19, the percentage of depression will be 2.9%, 4.8%, 4.9% and 5.5% from T1 to T4. Based on CIDI: 116 out of 461 (25.2%) met depressive disorder during the post-MI year Patients could be classified into 5 groups: 56.4% without depressive symptoms, 25.7% mild depressive symptoms, 9.3%moderate and increasing depressive symptoms, 4.6% significant but decreasing depressive symptoms, 4% significant and increasing depressive symptoms.

BDI: Beck Depression Inventory; CESD: Centre for Epidemiological Studies Depression-Scale; CIDI: Composite International Diagnostic Interview; DIS: Diagnostic Interview Schedule; DISH: Depression Interview and Structured Hamilton, HADS: Hospital Anxiety and Depression Scale; HRDS: Hamilton Rating scale for depression Scale; PHQ-9: Patient Health Questionnaire; SCID: Standard clinical interview for diagnostic and statistical manual of mental disorder; SCL-90: Symptom Check List-90; SRDS: Zung's Self-Rating Depression Scale

(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Depression prevalence & stability
Lane et al (2000ab, 2001a, 2002a)	Mixed (11: 21% > 1 MI)	T1: 2-15 days in hospital T2: 4-months post-MI T3: 12-months post-MI	T1: 288 (74.7% men, 3% with depression history, 52% with cardiac failure); age = 62.7 ± 11.5 T2: 199 T3: 188	BDI ≥ 10	T1: 30.9% depressed (more women, unemployed, with diabetes mellitus, high anxiety, less exercise, but nothing to do with the severity of cardiac disease) mean = 7.7 ± 6.3 T2: 37.7% depressed, mean = 9.3 ± 7.9 T3: 37.2% depressed, mean = 8.8 ± 7.4 T1-T2-T3 depression highly correlated, 40 were depressed at T1 and T2, 35 became depressed at T2, 19 became non-depressed between T1 to T2.
Lauzon et al (2003)	Mixed (21% > 1 MI)	T1: 2-3 days post-MI T2: 30 days T3: 6 months T4: 1 year	T1: 550 (79% men) T2: 466 T3: 464 T4: 486	BDI ≥ 10	T1: 35%, T2: 39% T3: 39% T4: 30% Those depressed at T1, 70% were depressed at T2 Those non-depressed at T1, only 24% became depressed at T2 Mean depression remained stable over time The prevalence of depressive symptoms remained stable
Luutonen et al (2002)	unknown	T1: hospitalisation T2: 6 months T3: 18 months	T1: 85 (65 men) Mean age = 60.7 ± 10.5 (age < 74) T2: 79 T3: 68	BDI 10 – 18 mild to moderate BDI 19 -29 moderate to severe BDI > 29 severe	Mean depression increased over time (p = 0.01) T1: 10-18: 13 (15.3%). >18: 5 (5.9%) T2: 10-18: 12 (15%), > 18: 12 (15%) T3: 10-18: 15 (22.1%), > 18: 8 (11.8%) At T3, those depressed (BDI > 9) 47.8% of them had depressive symptoms at T1 and those depressive at T1, 21.4% of them were free at T3. Ps. Post—MI depressive symptoms were not a transient phenomenon
Mayou (2000)	Mixed (22% > 1 MI) (29% had angina)	T1: 3 days in hospital T2: 3-months post-MI T3: 12-months post-MI	T1: 347 (73% men) (age = 63.16) T2: 243 T3: 224	HADS-depression > 7 (8-10: borderline) (> 10: probably clinical depression) Emotional disorder (distressed): using HADS-depression > 10 or combined HADS >19	T1: 9.9% borderline & 7.6% probable clinical depression Depression consistence – T1 – T2 depression improved; T2 – T3: no change. Overall no significant change (Depressed at T1 were still more depressed over a year) If using threshold of 19, 14.8% were probably emotional disorder at T1 Those were distressed at T1 had a higher percentage of remained distressed at T2 and T3, but those who were not distressed at T1 seldom became distressed at later stages. Distress correlated with younger age, psychological histories, low quality of life at T1, smokers, longer hospital stay.
Norris et al (2007)	Mixed (7% > 1 MI)	T1: In-hospital T2: 1 year later	486 (384 men) No age limit Men age = 59; Women age = 66	BDI-II 0-13: minimal depression 14-28: moderate depression 29-63: severe depression	T1: men – 30.2% moderate; 2.5% severe T2: men – 29.8 moderate; 2.1% severe T1: Women – 37.9% moderate; 2.4% severe T2: women – 36.4% moderate; 4% severe
Parashar et al (2006)	Mixed (19.7% > 1 MI at T2)	T1: in hospital T2: 1 months post-MI	T1: 2096 T2: 1881 (68.4% men, 12.5% had depression history)	PHQ ≥ 10	T1: 387 (20.6%) were depressed T2: 246 (13.1%) were depressed Beween T1 to T2, 4 groups were categorised – 7.1% had persistent depression (depressed at both times), 6.0% had new depression (only depressed at T2), 13.5% had transient depression (only depressed at T1), 73.5% had no depression at both times Ps. Depressed were more likely to be younger, women, single, unemployed, smokers, African American, with histories of hypertension, diabetes, COPD, CHD, depression, prior MI and worse baseline health status. Ps. Depression did not associate with disease severity (LVEF, and hospital complications)
Romanelli et al (2002)	Mixed (36% > 1 MI)	T1: 3 – 5 days hospitalisation T2: 4 months post-MI	T1: 153 (55.6% men) Age limit > 65 Mean age = 74.5 ± 1.2 T2: 101	1 BDI ≥ 10 2. SCID: interview based on DSM-III-R (SCI-DSM-III-R, Spitzer, 1987) (unknown cut-off)	35 (22.9%) were depressed (combined 27 patients with BDI > 9 and 21 patients with positive SCID results. 13 patients had both) T2: 19 (18.8%) depressed There was no significant change on depression between T1 & T2
Schlefer et al (1989)	Mixed (27% > 1 MI)	T1: 8-10 days post-MI T2: 3-4 months post-MI	T1: 283 (64% men); age = 63.7 ± 0.7 T2: 171 (60% men)	1. Schedule for Affective Disorders and Schizophrenia (SADS, Endicott, 1978) 2. Research Diagnostic Criteria (RDC, Spitzer, 1978) Both unknown cut-off	T1: 76 (27%) minor depressive disorder 52 (18%) major depressive disorder T2: 31 (18%) minor depressive disorder 25 (15%) major depressive disorder At T2, 17% of T1 non-depressed became depressed (11% minor, 6% major), 36% of T1 minor depressed were depressed (22% minor & 14% major) and 77% of T1 major depressed were depressed (33% minor & 44% major). Depression did not correlate with age, marriage, SES, psychiatric history, smoking history. Depression correlated with pre-MI stressful events and physical disorders
Shotani et al (2002)	Mixed (12.3% > 1 MI)	T1: 21 days post-MI T2: 3-months post-MI (T3: 12 months)	T1: 111 out of 1042 MI T2: 1042 MI (80.4% men) (52% < age 65) age = 63 ± 11	SRDS (Zung) ≥ 40	T1: unknown, but no significant difference between T1 sample and T2 sample (37.8 ± 7.4 vs. 38.6 ± 9.2, p = 0.318) T2: 438 (42%) were depressed Ps. Depression did not increase with ageing. Gender, MI history, smoking and other physical factors did not correlate with depression either.

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(continued)

Authors	1st MI or not	Measure times	Sample	Depression measure & cut-off	Depression prevalence & stability
Stern (1977)	mixed	T1: in hospital T2: 6-weeks post-MI T3: 3-months post-MI T4: 6-months post-MI T5: 1-year post-MI	68 (80.9% men) mean age = 53	Zung's SRDS ≥ 40	T1: 22% depressed T2: 17.3% depressed T3: 18% depressed T4: 15.9% depressed T5: 15% depressed Stability: those depressed at T1 remained so at T2, & 70% of these remained depressed at T5
Travella et al (1994)	Mixed (60% > 1 MI)	T1: in hospital T2: 3-months post-MI T3: 6 months post-MI T4: 9-months post-MI T5: 1-year post-MI	T1: 70 (75.7% men), Age = 58.6 ± 11.4 (37% had psychiatric medication) T2: 26 T3: 33 T4: 29 T5: 31	DSM-III Present State Examination (PSE, Wing et al., 1974) Severity of depressive symptoms – Hamilton Depression Rating Scale (Hamilton, 1960)	T1: 29% were depressed (26% major, 3% dysthymia) T2: 19% were depressed (15% major, 4% dysthymia) T3: 24% were depressed (21% major, 3% dysthymia) T4: 31% were depressed (28% major, 3% minor) T5: 29% were depressed (16% major, 13% dysthymia) Of those 13 out of 18 had major depression at T1, median duration of major depression was 4.5 months (1.5-12 months). Those with prolonged depression (>6 months) had more anxiety symptoms at T1 Major depression had nothing to do with psychiatric history
Van Elderen et al (1999)	mixed	T1: 1-month post-MI T2: 3-months post-MI T3: 12-months post-MI	T1: 278 (age = 54 ± 8.45) T2: 278 T3: 232	Maastricht Questionnaire, (Appels et al., 1995)	Stability: depression significantly decreased over time ($p < 0.01$)
Bennett et al (1999ac)	Yes	T1: in hospital T2: 3-months later	Age < 75 T1: 43 T2: 37 (mean age = 62, 71% men)	HADS ≥ 11 (combined depression and anxiety scores)	T1: 5 (out of 43, 11.6%) were depressed and anxious T2: 1 (out of 37, 2.7%) was depressed; 8 (out of 37, 21.6%) were anxious Stability – mean depression significantly decreased ($p < 0.05$) (mean anxiety remained stable)
Brink et al. (2002a) (2005)	Yes	T1: 1-2 days before discharge T2: 5 months later T3: 1 year later	T1-T2: 114 (67.5% men) Age (M) = 65.4 ± 10.1 Age (W) = 72.2 ± 8.6 T3: 98 (66.3% men) Age (M) = 64.6 ± 9.8 Age (F) = 71.4 ± 8.7	HADS ≥ 8 – possible depressed/anxious HADS ≥ 11 for probable anxiety/depression	T1: 13 (11.4%) ≥ 8, 9 of these 13 (7.8% of total) had probable depression or anxiety T2: 27 (24%) ≥ 8 on depression or anxiety, and 10 of these (9%) ≥ 11, had probable depression or anxiety T3: 13% Ps. Mean depression score decreased for women from T2 to T3 ($p < 0.02$). Men's depression score remained stable from T2 to T3
Dickens et al (2004, 2005)	Yes (14% had angina)	T1: 3-6 days in hospital T2: 12 months	T1: 314 (63.4% men) age = 57.6 4 ± 11.2 T2: 269	1. HADS ≥ 17 2. The Schedule for Clinical Assessment in Nueropsychiatric Disorder (SCAND, WHO, 1996) – using ICD-10 as diagnostic criteria	T1: HADS - 95 (30.3%) met depression SCAN - 65 (21%) met ICD-10 for depressive disorder (1 month before MI onset) T2: Of 189 non-depressed at T1, 20.6% became depressed at T2 and 150 remained non-depressed T2: Of 80 depressed at T1, 36 (45%) no longer reach HADS ≥ 17, and 44 (55%) remained depressed Ps. 63.4% had other medical problems
Dickens et al (2006)	Yes	T1: 3-6 days in hospital T2: 6 months T3: 12 months	260	HADS ≥ 8 possible depression HADS ≥ 17 probable major depressive disorder	Stability: mean depression remained stable from T1 to T3 But for those depressed at T1, 45% improved at T3; For those non-depressed at T1, 21% got worse at T3.
Jacobsen et al (1992b)	Yes	T1: 72 hours post-MI T2: 3-5 months post-MI	T1 & T2: 42 (55% men)	Multiple Affect Adjective Checklist (Zuckerman, 1965) (unknown cut-off)	Prevalence – unknown Stability - no significant difference between T1 & T2 (14.44 ± 6.38 vs. 13.21 ± 6.8, $p = 0.316$)
Pedersen et al (2004)	Yes	T1: 4-6 weeks post-MI T2: 9-months post-MI	T1: 112 T2: 104 (mean age = 61 ± 9.5)	Trauma symptom Checklist (Briere, 1989) (unknown cut-off)	Prevalence: unknown Stability: stable over time ($p = 0.11$)
Strik et al (2004)	Yes	T1: 1-month post-MI T2: 3-months post-MI T3: 6-months post-MI T4: 9-months post-MI T5: 12-months post-MI	206 (75.7% men)	T1: Structured clinical interview for DSM-IV (SCID-IV-R, First, 1995) T2, T3, T4: BDI ≥ 10, HADS ≥ 7, SCL-90 ≥ 22	After excluding 11 patients with depression pre-MI, 1-year cumulative incidence rate of major/minor depression = 31% (n = 52), with the highest incidence rate at T1 (14.4%) The incidence of minor depression was higher from 3-12 months than that of major depression BDI: Over the year, total 109 (52.8%) developed depressive symptoms
Thornton & Hallas (1999)	Yes	T1: 4-weeks post-MI T2: 18-months post-MI	30 (age = 64.2 ± 3.2)	HADS total ≥ 11 = clinical case; total: 8 – 10 = borderline	Depression consistence: stable from T1 to T2 (T1 5.0 ± 3.5; T2: 4.1 ± 3.0)
Wiklund et al (1984)	Yes	T1: 2-months post-MI T2: 1-year post-MI	177 men (age = 54)	Interview (unknown cut-off)	T1: 63% depressed T2: 48% depressed

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APPENDIX B. 119 MI PATIENTS' CHARACTERISTICS DURING HOSPITALISATION

Appendix B-1. Gender comparisons on moods during MI patients' hospitalisation

Measure	Total Mean (SD)	Males Mean (SD)	Females Mean (SD)	Male – Female (99% CI)	t value	p value
Depression	16.99 (11.33)	15.79 (10.68)	20.72 (12.62)	-4.935 (-11.186 – 1.315)	-2.067	0.041
State anxiety	36.19 (13.01)	34.52 (11.82)	41.38 (15.52)	-6.861 (-15.363 – 1.641)	-2.185	0.035
Positive affect	26.47 (7.62)	26.75 (7.47)	25.59 (8.13)	1.167 (-3.109 – 5.442)	0.715	0.476
Negative affect	20.18 (9.38)	20.05 (9.47)	20.62 (9.28)	-0.568 (-6.106 – 4.969)	-0.269	0.788

Appendix B- 2. Gender comparisons on causal attributions during MI patients' hospitalisation

	Males Mean (SD)	Females Mean (SD)	Male – Female (99% CI)	t	p
1. Stress or worry	3.80 (1.20)	3.97 (1.24)	-0.166 (-0.842 – 0.511)	-0.641	0.523
2. Eating fatty foods	3.29 (1.31)	2.86 (1.16)	0.427 (-0.286 – 1.139)	1.569	0.119
3. The type of work you do or did	3.12 (1.28)	2.52 (1.30)	0.605 (-0.113 – 1.323)	2.207	0.029
4. High levels of cholesterol	3.42 (1.03)	3.45 (1.06)	-0.026 (-0.604 – 0.552)	-0.118	0.906
5. Heredity-runs in your family	2.96 (1.45)	3.48 (1.33)	-0.527 (-1.323 – 0.269)	-1.735	0.085
6. Smoking	3.33 (1.52)	3.00 (1.51)	0.333 (-0.516 – 1.183)	1.208	0.306
7. Being overweight	2.74 (1.26)	2.97 (1.32)	-0.221 (-0.934 – 0.492)	-0.812	0.418
8. Just bad luck or chance	2.89 (1.18)	2.83 (1.07)	0.061 (-0.582 – 0.705)	0.249	0.803
9. Fate	2.71 (1.13)	2.86 (1.16)	-0.151 (-0.788 – 0.486)	-0.620	0.536
10. High blood pressure	3.09 (1.22)	3.07 (1.22)	0.020 (-0.664 – 0.704)	0.076	0.939
11. Poor diet	2.71 (1.23)	2.90 (1.45)	-0.185 (-0.904 – 0.533)	-0.676	0.500
12. Pollution in the environment	3.10 (1.06)	2.48 (0.91)	**0.617 (0.043 – 1.191)**	**2.815** d = 0.61**	**0.006**
13. Arguing with people	2.44 (1.08)	2.59 (1.40)	-0.142 (-0.794 – 0.511)	-0.499	0.621
14. Over exertion or sudden exercise	2.88 (1.13)	2.55 (1.27)	0.326 (-0.325 – 0.977)	1.311	0.193
15. Lack of exercise	2.78 (1.27)	3.28 (1.25)	-0.498 (-1.206 – 0.209)	-1.843	0.068
16. Depression	2.58 (1.21)	2.86 (1.41)	-0.284 (-0.988 – 0.420)	-1.058	0.292
17. Drinking too much alcohol	2.47 (1.25)	1.86 (1.19)	0.605 (-0.085 – 1.294)	2.297	0.023
18. The way other people treated you	2.40 (1.13)	2.21 (1.47)	0.193 (-0.489 – 0.876)	0.741	0.460
19. Listening to other people's problems	2.47 (0.99)	2.24 (1.41)	0.225 (-0.390 – 0.841)	0.802	0.428
20. A germ or virus	2.38 (0.93)	2.07 (0.92)	0.309 (-0.211 – 0.828)	1.556	0.122
21. Your mental attitude	2.22 (0.88)	2.38 (1.29)	-0.157 (-0.715 – 0.401)	-0.610	0.546
22. Poor medical care in the past	2.28 (1.04)	1.90 (1.05)	0.381 (-0.201 – 0.963)	1.715	0.089
23. Family problems or worries	2.82 (1.26)	3.10 (1.47)	-0.281 (-1.016 – 0.453)	-1.003	0.318
24. Overwork	2.92 (1.25)	2.59 (1.48)	0.336 (-0.394 – 1.066)	1.205	0.231
Component 1: stress	2.77 (0.71)	2.70 (1.99)	0.066 (-0.375 – 0.506)	0.390	0.697
Component 2: external/uncontrollable causes	2.77 (0.75)	2.56 (0.57)	0.209 (-0.190 – 0.608)	1.373	0.172
Component 3: unhealthy lifestyles	2.97 (0.81)	2.92 (0.79)	0.057 (-0.396 – 0.509)	0.328	0.743

Appendix B- 3. Gender comparisons on factor components of timeline, consequences, and cure/control during MI patients' hospitalisation

	Males (SD)	Females (SD)	Male – Female (99% CI)	t	p
Physical/external consequences	3.15 (0.73)	2.82 (0.70)	0.330 (-0.075 – 0.735)	2.131	0.035
Emotional/invisible consequences	3.30 (0.60)	3.27 (0.80)	0.297 (-0.407 – 0.467)	0.184	0.855
Time line	3.12 (0.75)	2.99 (0.79)	0.125 (-0.299 – 0.549)	0.770	0.443
Active control	3.97 (0.54)	4.06 (0.62)	-0.094 (-0.405 – 0.218)	-0.787	0.433
Passive control	2.66 (0.71)	2.73 (0.80)	-0.077 (-0.486 – 0.331)	-0.495	0.662
Future cardiac threat	3.14 (1.06)	3.03 (1.12)	0.481 (-0.489 – 0.709)	0.481	0.631

Appendix B- 4. The full correlation table of 119 MI patients' demographic data with moods and illness perceptions during patients' hospitalisation

Pearson's r (correlation)	Days between admission and assessment	Patients' education	Patients' age (99% CI; Effect size; p value)	Income status	Ethnicity (Caucasian or not)	Gender	Living condition
Depression	0.200 (p = 0.030)	0.038 (p = 0.680)	-0.065 (p = 0.485)	**-0.240** (-0.005 - -0.45 d = 0.49; p = 0.009)**	0.086 (p = 0.355)	0.171 (p = 0.063)	-0.083 (p = 0.371)
State anxiety	0.111 (p = 0.231)	-0.008 (p = 0.927)	-0.069 (p = 0.337)	-0.212 (p = 0.021)	0.202 (p = 0.028)	0.195 (p = 0.033)	-0.096 (p = 0.298)
Positive affect	-0.132 (p = 0.153)	0.036 (p = 0.697)	-0.015 (p = 0.873)	0.194 (p = 0.035)	**-0.285** (-0.49 - -0.05, d = 0.59; p = 0.002)**	-0.062 (p = 0.380)	-0.002 (p = 0.987)
Negative affect	0.029 (p = 0.764)	0.026 (p = 0.787)	**-0.285** (-0.045 - -0.49 d= 0.59 ; p = 0.002)**	-0.099 (p = 0.299)	0.164 (p = 0.086)	0.018 (p = 0.852)	-0.023 (p = 0.814)
Cause 1 – stress	0.001 (p = 0.989)	0.050 (p = 0.586)	**-0.286** (-0.048 - -0.48 d = 0.60 ; p = 0.002)**	0.088 (p = 0.339)	0.010 (p = 0.915)	-0.093 (p = 0.313)	0.167 (p = 0.068)
Cause 2 – uncontrollable causes	0.193 (p = 0.036)	-0.142 (p = 0.124)	0.220 (p = 0.016)	-0.112 (p = 0.226)	-0.131 (p = 0.157)	-0.122 (p = 0.188)	-0.066 (p = 0.479)
Cause 3 – unhealthy lifestyle	-0.113 (p = 0.200)	-0.192 (p = 0.036)	**-0.231** (-0.005 - -0.44 d = 0.47; p = 0.010)**	-0.033 (p = 0.721)	0.107 (p = 0.245)	-0.057 (p = 0.540)	-0.091 (p = 0.324)
Physical consequences	0.058 (p = 0.531)	0.054 (p = 0.563)	-0.198 (p = 0.031)	-0.130 (p = 0.158)	-0.075 (p = 0.415)	-0.183 (p = 0.046)	-0.039 (p = 0.674)
Emotional consequences	0.052 (p = 0.572)	-0.004 (p = 0.964)	-0.159 (p = 0.084)	-0.113 (p = 0.221)	0.060 (p = 0.519)	0.010 (p = 0.916)	0.023 (p = 0.808)
Time-line	0.020 (p = 0.829)	< 0.001 (p = 0.996)	-0.130 (p = 0.159)	0.020 (p = 0.828)	**0.295** (0.06 – 0.50 d = 0.62; p = 0.001)**	-0.039 (p = 0.670)	-0.058 (p = 0.533)
Active control	-0.158 (p = 0.086)	-0.032 (p = 0.731)	**-0.239** (-0.005 - -0.45 d = 0.49; p = 0.009)**	-0.069 (p = 0.457)	-0.057 (p = 0.538)	0.084 (p = 0.366)	-0.086 (p = 0.353)
Passive control	0.145 (p = 0.115)	-0.120 (p = 0.194)	**0.321** (0.09 – 0.515 d = 0.68; p < 0.001)**	**-0.342** (-0.09 - -0.51 d = 0.73; p < 0.001)**	-0.036 (p = 0.696)	0.068 (p = 0.465)	-0.072 (p = 0.439)
Future cardiac threat	0.036 (p = 0.698)	0.124 (p = 0.179)	-0.041 (p = 0.657)	-0.128 (p = 0.166)	0.176 (p = 0.056)	-0.010 (p = 0.917)	-0.215 (p = 0.019)
Physical symptoms	0.192 (p = 0.036)	-0.002 (p = 0.980)	0.017 (p = 0.856)	-0.164 (p = 0.074)	0.206 (p = 0.024)	0.174 (p = 0.058)	-0.041 (p = 0.655)

Appendix B-5. The full correlation table of 119 MI patients' moods and illness perceptions during patients' hospitalisation

	119 MI patients' mood and illness perceptions during hospitalisation				
	Depression	State anxiety	Positive affect	Negative affect	Causal component 1: stress
State anxiety	0.624** (p < 0.001) CI: 0.45 – 0.745, d = 1.60				
Positive affect	-0.451** (p < 0.001) CI: -0.58 - -0.18, d = 1.01	-0.300** (p = 0.001) CI: -0.07 - -0.50, d = 0.63			
Negative affect	0.612** (p < 0.001) CI: 0.43 – 0.74, d = 1.55	0.600** (p < 0.001) CI: 0.29 – 0.66 , d = 1.5	-0.179 (p = 0.060)		
Cause component 1: stress	0.210 (p = 0.022)	0.167 (p = 0.070)	0.030 (p = 0.746)	0.190 (p = 0.045)	
Causal component 2: external causes	0.074 (p = 0.425)	-0.085 (p= 0.356)	0.065 (p = 0.485)	-0.109 (p = 0.253)	0.068 (p = 0.465)
Causal component 3: unhealthy lifestyle	0.035 (p = 0.705)	0.040 (p = 0.666)	0.052 (p = 0.575)	0.224 (p = 0.018)	0.483** (p < 0.001) CI: 0.28 – 0.64 d = 1.10
Consequence component 1: Physical consequences	0.367** (p < 0.001) CI: 0.149 – 0.555 d = 0.79	0.278** (p = 0.002) CI: 0.16 – 0.565 d = 0.58	-0.082 (p = 0.377)	0.331** (p < 0.001) CI: 0.104 – 0.525 d = 0.70	0.360** (p < 0.001) CI: 0.14 – 0.55 d = 0.77
Consequence component 2: Emotional consequences	0.393** (p < 0.001) CI: 0.172 – 0.575 d = 0.85	0.429** (p < 0.001) CI: 0.22 – 0.605 d = 0.95	-0.184 (p = 0.046)	0.462** (p < 0.001) CI: 0.252 – 0.625 d = 1.04	0.292** (p = 0.001) CI: 0.05 – 0.49 d = 0.61
Timeline	0.205 (p = 0.025)	0.341** (< 0.001) CI: 0.11 – 0.53 d = 0.73	-0.181 (p = 0.050)	0.233 (p = 0.014)	0.216 (p = 0.018)
Control component 1: Active control	0.061 (p = 0.511)	-0.066 (p = 0.478)	0.092 (p = 0.323)	0.135 (p = 0.157)	0.116 (p = 0.210)
Control component 2: Passive control	0.008 (p = 0.928)	-0.038 (p = 0.682)	0.022 (p = 0.810)	0.037 (p = 0.698)	-0.042 (p = 0.648)
Cardiac threat	0.235** (p = 0.01) CI: 0.0003 – 0.445 d = 0.48	0.362** (p < 0.001) CI: 0.137 – 0.55 d = 0.78	-0.159 (p = 0.086)	0.207 (p = 0.029)	0.132 (p = 0.154)
Symptom perception	0.556** (p < 0.001) CI: 0.37 – 0.70 d = 1.34	0.454** (p < 0.001) CI: 0.245 – 0.625 d = 1.02	-0.140 (p = 0.132)	0.453** (p < 0.001) CI: 0.243 – 0.618 d = 1.02	0.344** (p < 0.001) CI: 0.11 – 0.53 d = 0.73

*** $p \leq 0.001$; ** $p \leq 0.01$; d = effect size(d = 0.2, small; d = o.5, medium; d = 0.8, large)

(continued)

	119 MI patients' moods and illness perceptions during hospitalisation				
	Causal component 2: External causes	Causal component 3: unhealthy lifestyles	Consequence component 1: Physical consequences	Consequence component 2: Emotional consequences	Timeline
State anxiety					
Positive affect					
Negative affect					
Causal component 1: stress					
Causal component 2: external					
Causal component 3: unhealthy lifestyle	-0.015 (p = 0.873)				
Consequence component 1: Physical consequences	0.152 (p = 0.099)	0.308** (p = 0.001) CI: 0.07 – 0.50 d = 0.65			
Consequence component 2: Emotional consequences	0.019 (p = 0.839)	0.166 (p = 0.071)	0.456** (p < 0.001) CI: 0.251 – 0.625 d = 1.02		
Timeline	-0.090 (p = 0.329)	0.073 (p = 0.432)	0.468** (p < 0.001) CI: 0.266 – 0.630 d = 1.06	0.430** (p < 0.001) CI: 0.22 – 0.61 d = 0.95	
Control component 1: Active control	0.010 (p = 0.916)	0.383** (p < 0.001) CI: 0.16 – 0.56 d = 0.83	-0.035 (p = 0.705)	-0.004 (p = 0.966)	-0.117 (p = 0.207)
Control component 2: Passive control	0.366** (p < 0.001) CI: 0.14 – 0.556 d = 0.79	0.015 (p = 0.868)	0.223 (p = 0.015)	0.102 (p = 0.272)	-0.027 (p = 0.770)
Cardiac threat	-0.034 (p = 0.714)	-0.005 (p = 0.956)	0.342** (p < 0.001) CI: 0.11 – 0.53 d = 0.73	0.211 (p = 0.021)	0.590** (p < 0.001) CI: 0.335 – 0.68 d = 1.46
Symptom perception	0.005 (p = 0.960)	0.308** (p = 0.001) CI: 0.08 – 0.51 d = 0.65	0.386** (p < 0.001) CI: 0.166 – 0.57 d = 0.89	0.293** (p = 0.001) CI: 0.06 – 0.49 d = 0.61	0.226 (p = 0.014)

*** $p \leq 0.001$; ** $p \leq 0.01$; d = effect size(d = 0.2, small; d = o.5, medium; d = 0.8, large)

(continued)

	Patient participants' mood at the acute stage		
	Control component 1: Active control	Control component 2: Passive control	Cardiac threat
State anxiety			
Positive affect			
Negative affect			
Causal component 1: stress			
Causal component 2: external			
Causal component 3: unhealthy lifestyle			
Consequence component 1: Physical consequences			
Consequence component 2: Emotional consequences			
Timeline			
Control component 1: Active control			
Control component 2: Passive control	-0.078 (p = 0.400)		
Cardiac threat	-0.094 (p = 0.308)	-0.054 (p = 0.560)	
Symptom perception	0.155 (p = 0.092)	0.044 (p = 0.632)	0.160 (p = 0.083)

*** p ≤ 0.001; ** p ≤ 0.01; d = effect size(d = 0.2, small; d = o.5, medium; d = 0.8, large)

Appendix B-6. Hierarchical regression on the 119 MI patients' in-hospital depression

Predictor Variable	β	t (118)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Model 1			0.061	0.053	
Income	-0.247	-2.746**			
$F_{(1, 116)} = 7.543$, $p = 0.007$					
Model 2			0.336	0.324	
Block 1					
Income	-0.170	-2.208*			
Block 2					
Time 1 symptom perception	0.530	6.894***			
$F_{(2, 116)} = 29.049$, $p < 0.001$					
Model 3					
Block 1			0.403	0.377	
Income	-0.145	-1.950			
Block 2					
Time 1 symptom perception	0.434	5.395***			
Block 3					
Time 1 physical consequence belief	0.060	0.675			
Time 1 emotional consequence belief	0.211	2.538*			
Time 1 future cardiac threat	0.086	1.102			
$F_{(5, 112)} = 15.148$, $p < 0.001$					
Module 4					
Block 1			0.061	0.053**	
Income	-0.048	-0.737			
Block 2			0.336	0.324	27.1***
Time 1 symptom perception	0.292	3.984***			
Block 3			0.403	0.377	5.3**
Time 1 physical consequence belief	0.118	1.551			
Time 1 emotional consequence belief	0.057	0.757			
Cardiac threat	-0.036	-0.513			
Block 4			0.579	0.552	17.5***
Time 1 state anxiety	0.353	4.390***			
Time 1 positive affect	-0.281	-4.271***			
$F_{(7, 110)} = 21.574$, $p < 0.001$					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Appendix B-7. Hierarchical regression on the 118 MI patients' in-hospital state anxiety

Predictor Variable	β	t (117)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Model 1			0.252	0.246	
Block 1					
Time 1 symptom perception	0.502	6.229***			
$F_{(1, 115)} = 38.801$, $p < 0.001$					
Model 2			0.392	0.365	
Block 1					
Time 1 symptom perception	0.400	4.898***			
Block 2					
Time 1 physical consequence belief	-0.106	-1.147			
Time 1 emotional consequence belief	0.314	3.586***			
Time 1 belief of illness duration	0.018	0.178			
Time 1 future cardiac threat	0.219	2.380*			
$F_{(5, 111)} = 14.330$, $p < 0.001$					
Model 3					
Block 1			0.252	0.246***	
Time 1 symptom perception	0.203	2.538*			
Block 2			0.392	0.365	11.9***
Time 1 physical consequence belief	-0.152	-1.851			
Time 1 emotional consequence belief	0.194	2.444*			
Time 1 belief of illness duration (timeline)	0.080	0.886			
Time 1 future cardiac threat	0.123	1.497			
Block 3			0.543	0.514	14.9***
Time 1 depression	0.480	5.278***			
Time 1 positive affect	-0.022	-0.301			
$F_{(7, 109)} = 18.530$, $p < 0.001$					
Ps. ID = 50 was excluded					

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Appendix B-8. Hierarchical regression on the 118 MI patients' in-hospital positive affect

Predictor Variable	β	t (117)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Model 1			0.102	0.094	
Block 1					
Caucasian (or not)	-0.319	-3.615***			
$F_{(1, 116)} = 13.071$, $p < 0.001$					
Model 2					
Block 1			0.102	0.094***	
Caucasian (or not)	-0.289	-3.500***			
Block 2			0.273	0.254	16.0***
Time 1 depression	-0.444	-4.090***			
Time 1 state anxiety	0.046	0.414			
$F_{(3, 113)} = 14.147$, $p < 0.001$					
Ps. ID = 50 was excluded					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

Appendix B-9. Hierarchical regression on the 110 MI patients' in-hospital negative affect

Predictor Variable	β	t (110)	Cumulative R^2	Cumulative adj. R^2	Incremental adj. R^2 (%)
Model 1			0.102	0.093	
Block 1					
Age	-0.319	-3.495***			
$F_{(1, 108)} = 12.215$, $p = 0.001$					
Model 2			0.295	0.282	
Block 1					
Age	-0.311	-3.830***			
Block 2					
Time 1 symptom perception	0.440	5.423***			
$F_{(2, 107)} = 22.416$, $p < 0.001$					
Model 3			0.370	0.346	
Block 1					
Age	-0.255	-3.198**			
Block 2					
Time 1 symptom perception	0.355	4.150***			
Block 3					
Time 1 physical consequence belief	0.011	0.119			
Time 1 emotional consequence belief	0.288	3.266***			
$F_{(4, 106)} = 15.444$, $p < 0.001$					
Model 4					
Block 1			0.102	0.093***	
Age	-0.228	-3.135**			
Block 2			0.295	0.282	18.9***
Time 1 symptom perception	0.215	2.584*			
Block 3			0.370	0.346	6.4**
Time 1 physical consequence belief	0.005	0.065			
Time 1 emotional consequence belief	0.160	1.895			
Block 4			0.482	0.457	11.1***
Time 1 state anxiety	0.402	4.743***			
$F_{(5, 104)} = 19.383$, $p < 0.001$					
Ps. ID = 30 was excluded					

* p ≤0.05, ** p ≤0.01, *** p ≤ 0.001

APPENDIX C – 91 MI PATIENTS' CHARACTERISTICS DURING THE FIRST SIX MONTHS POST-MI

Appendix C- 1. The full correlation table of 91 MI patients' moods over the first six months

patients	Time 1			Time 2			Time 3		
	Depression	State anxiety	Positive affect	Depression	State anxiety	Positive affect	Depression	State anxiety	Positive affect
State anxiety	0.620, $p < 0.001$			0.690, $p < 0.001$			0.786, $p < 0.001$		
Positive affect	-0.495, $p < 0.001$	-0.268, $p = 0.010$		-0.299, $p = 0.004$	-0.246, $p = 0.019$		-0.337, $p = 0.001$	-0.419, $p < 0.001$	
Negative affect	0.653, $p < 0.001$	0.623, $p < 0.001$	-0.203, $p = 0.063$	0.808, $p < 0.001$	0.686, $p < 0.001$	-0.097, $p = 0.360$	0.669, $p = 0.001$	0.590, $p < 0.001$	-0.190 $p = 0.071$

Appendix C- 2. Correlations between the 91 MI patients' illness perceptions at each assessment

ne 1	In-hospital illness perceptions								
spitalisation	Causal component 1 Stress	Causal component 2 external	Causal component 3 lifestyles	Consequence component 1 Physical	Consequence component 2 emotional	Timeline	Control component 1 Active control	Control component 2 Passive control	Future MI threat
usal mponent 2 controllable	0 046 p = 0 665								
usal mponent 3 healthy stytes	**0.515** **p < 0.001**	-0 030 p = 0 779							
nsequence mponent 1: ysical	**0.398** **p < 0.001**	0 118 p = 0 266	**0.365** **p < 0.004**						
nsequence mponent 2: notional	**0.316** **p = 0.002**	-0 010 p = 0 926	0 170 p = 0 107	**0.451** **p < 0.001**					
neline	0.261 p = 0 012	-0 105 p = 0 323	0 125 p = 0 255	**0.357** **p = 0.001**	**0.408** **p < 0.001**				
ntrol mponent 1: tive control	0.046 p = 0 666	-0 019 p = 0 855	**0.308** **p = 0.003**	-0 118 p = 0 265	0 125 p = 0 239	-0 059 p = 0 581			
ntrol mponent 2: ssive control	-0 177 p = 0 094	0 121 p = 0 254	-0 078 p = 0 462	0 013 p = 0 904	-0 124 p = 0 243	-0 226 p = 0 031	-0 063 p = 0 554		
ture MI threat	0 187 p = 0 075	-0 090 p = 0 398	-0 038 p = 0 720	0 170 p = 0 108	0 168 p = 0 111	**0.568** **p < 0.001**	-0 040 p = 0 706	-0 209 p = 0 047	
mptom rception	**0.286** **p = 0.006**	-0 087 p = 0 415	**0.380** **p < 0.001**	**0.381** **p < 0.001**	**0.273** **p = 0.009**	0 223 p = 0 034	0 219 p = 0 037	-0 010 p = 0 925	0 104 p = 0 326

me 2	4-8 weeks post-MI illness perceptions								
8 weeks post-	Causal component 1: Stress	Causal component 2: External	Causal component 3: lifestyle	Consequence component 1: Physical	Consequence component 2: emotional	Timeline	Control component 1: Active control	Control component 2: Passive control	Future MI threat
ausal mponent 2: ternal	0 174 p = 0 098								
ausal mponent 3: festyle	**0.426** **p < 0.001**	0 141 p = 0 183							
onsequence mponent 1: hysical	**0.475** **p < 0.001**	0 169 p = 0 109	**0.322** **p = 0.002**						
onsequence mponent 2: notional	**0.517** **p < 0.001**	0 104 p = 0 327	**0.293** **p = 0.005**	**0.740** **p < 0.001**					
meline	0.235 p = 0.025	-0.020 p = 0.852	0.076 p = 0.474	**0.368** **p < 0.001**	**0.523** **p < 0.001**				
ntrol mponent 1: tive control	0.179 p = 0 089	0.097 p = 0 361	**0.455** **p < 0.001**	0 151 p = 0 153	0.072 p = 0 495	-0.179 p = 0 090			
ntrol mponent 2: ssive control	0.211 p = 0.044	**0.460** **p < 0.001**	0.038 p = 0.722	**0.395** **p < 0.001**	**0.336** **p = 0.001**	-0.177 p = 0.094	0 024 p = 0 825		
uture MI threat	0.191 p = 0.069	0.007 p = 0.946	-0.076 p = 0.475	**0.283** **p = 0.006**	**0.305** **p = 0.003**	**0.460** **p < 0.001**	-0 151 p = 0 153	0.030 p = 0.776	
mptom rception	**0.477** **p < 0.001**	0.097 p = 0.362	0.260 p = 0.013	**0.480** **p < 0.001**	**0.491** **p < 0.001**	0.175 p = 0.097	0.120 p = 0.259	0.205 p = 0.052	0.244 p = 0.020

Time 3	6-month illness perceptions									
Causal component 1: Stress	Causal component 2: External	Causal component 3: lifestyles	Consequence component 1: Physical	Consequence component 2: emotional	Timeline	Control component 1: Active	Control component 2: Passive	Future MI threat	Symptom perception
0.192 p = 0.068									
0.223 p = 0.034	0 017 p = 0 874								
0.318 **p = 0.002**	0 224 p = 0 033	**0.300** **p = 0.004**							
0.339 **p = 0.001**	0.242 p = 0.021	0.220 p = 0.036	**0.722** **p < 0.001**						
0.076 p = 0.472	-0.256 p = 0.014	0.063 p = 0.556	0.184 p = 0.080	**0.307** **p = 0.003**					
0.061 p = 0.567	-0.012 p = 0.912	**0.343** **p = 0.001**	-0.106 p = 0.317	-0.222 p = 0.034	-0.249 p = 0.017				
0.166 p = 0.115	**0.456** **p < 0.001**	0.108 p = 0.307	**0.426** **p < 0.001**	0.257 p = 0.014	-0.192 p = 0.068	-0.098 p = 0 353			
0.217 p = 0.039	0.020 p = 0.849	0.028 p = 0.793	0.222 p = 0.034	**0.416** **p < 0.001**	**0.490** **p < 0.001**	**-0.320** **p = 0.002**	0.075 p = 0.481		
0.137 p = 0.197	0.050 p = 0.640	0.178 p = 0.092	**0.537** **p < 0.001**	**0.528** **p < 0.001**	0.248 p = 0.018	**-0.291** **p = 0.005**	0 047 p = 0.660	**0.340** **p = 0.001**	

(continued)

Time 1	In-hospital illness perceptions				
Hospitalisation	Causal component 1: Stress	Causal component 3 lifestyles	Consequence component 1 Physical	Consequence component 2 emotional	Timeline
Causal component 2: External					
Causal component 3: Lifestyles	0.515				
Consequence component 1: Physical	0.398	0.365			
Consequence component 2: Emotional	0.316		0.451		
Timeline			0.357	0.408	
Control component 1: Active control		0.308			
Future MI threat					0.568
Symptom perception	0.286	0.381	0.381	0.273	

Time 2	4-8 weeks post-MI illness perceptions					
4-8 weeks post-MI	Causal component 1: Stress	Causal component 2: External	Causal component 3 lifestyles	Consequence component 1: Physical	Consequence component 2 emotional	Timeline
Causal component 2: External						
Causal component 3: Lifestyle	0.426					
Consequence component 1: Physical	0.475		0.322			
Consequence component 2: Emotional	0.517		0.293	0.740		
Timeline				0.368	0.523	
Control component 1: Active control			0.455			
Control component 2: Passive control		0.460		0.395	0.336	
Future MI threat				0.283	0.305	0.460
Symptom perception	0.477			0.460	0.491	

	6-month post-MI illness perceptions								
6-months post-MI	Causal component 1: Stress	Causal component 2: External	Causal component 3 lifestyles	Consequence component 1: Physical	Consequence component 2 Emotional	Timeline	Control component 1: Active control	Future MI threat	Symptom perception
Causal component 2: External									
Causal component 3 Lifestyles									
Consequence component 1: Physical	0.319		0.300						
Consequence component 2: Emotional	0.339			0.722					
Timeline					0.307				
Control component 1: Active control			0.343						
Control component 2: Passive control		0.456		0.426					
Future MI threat					0.416	0.490	-0.320		
Symptom perception				0.537	0.526		-0.291	0.340	

Appendix C- 3. Correlations between the 91 MI patients' moods and illness perceptions at three assessments

	Hospitalisation				4-8 weeks post-MI					6-month post-MI				
	Depression	State anxiety	Positive affect	Negative affect		Depression	State anxiety	Positive affect	Negative affect		Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	0.243, p = 0.020	0.147, p = 0.165	-0.021, p = 0.841	0.210, p = 0.054	Causal component 1: Stress	**0.455, p < 0.001**	**0.406, p < 0.001**	-0.097, p = 0.361	**0.436, p < 0.001**	Causal component 1: Stress	**0.290, p = 0.005**	**0.348, p = 0.001**	-0.259, p = 0.013	**0.347, p = 0.001**
Causal component 2: External	0.046, p = 0.668	-0.005, p = 0.965	0.052, p = 0.627	-0.074, p = 0.500	Causal component 2: External	0.070, p = 0.510	0.059, p = 0.578	0.108, p = 0.307	0.155, p = 0.141	Causal component 2: External	0.119, p = 0.261	0.090, p = 0.396	-0.201, p = 0.056	0.163, p = 0.122
Causal component 3: Lifestyle	0.059, p = 0.578	-0.004, p = 0.971	0.011, p = 0.916	0.144, p = 0.189	Causal component 3: Lifestyle	0.166, p = 0.117	0.112, p = 0.289	-0.108, p = 0.307	0.155, p = 0.143	Causal component 3: Lifestyle	0.076, p = 0.476	0.051, p = 0.629	-0.023, p = 0.830	0.082, p = 0.438
Consequence component 1: Physical	**0.415, p < 0.001**	**0.336, p = 0.001**	-0.092, p = 0.385	**0.387, p < 0.001**	Consequence component 1: Physical	**0.459, p < 0.001**	**0.374, p < 0.001**	-0.084, p = 0.427	**0.382, p < 0.001**	Consequence component 1: Physical	**0.405, p < 0.001**	**0.409, p < 0.001**	-0.155, p = 0.143	**0.295, p = 0.004**
Consequence component 2: Emotional	**0.429, p < 0.001**	**0.426, p < 0.001**	-0.231, p = 0.027	**0.458, p < 0.001**	Consequence component 2: Emotional	**0.498, p < 0.001**	**0.467, p < 0.001**	-0.143, p = 0.178	**0.438, p < 0.001**	Consequence component 2: Emotional	**0.472, p < 0.001**	**0.498, p < 0.001**	**-0.272, p = 0.009**	**0.348, p = 0.001**
Timeline	**0.288, p = 0.006**	**0.434, p < 0.001**	-0.192, p = 0.068	0.256, p = 0.018	Timeline	0.194, p = 0.065	**0.293, p = 0.005**	-0.246, p = 0.019	0.178, p = 0.092	Timeline	0.135, p = 0.203	0.264, p = 0.011	-0.243, p = 0.020	0.021, p = 0.840
Control component 1: Active control	0.141, p = 0.184	0.105, p = 0.320	-0.030, p = 0.780	0.166, p = 0.130	Control component 1: Active control	-0.035, p = 0.742	0.057, p = 0.591	0.221, p = 0.035	0.065, p = 0.541	Control component 1: Active control	-0.105, p = 0.320	-0.160, p = 0.130	**0.330, p = 0.001**	0.070, p = 0.509
Control component 2: Passive control	-0.053, p = 0.619	-0.032, p = 0.764	0.047, p = 0.658	0.004, p = 0.972	Control component 2: Passive control	**0.363, p < 0.001**	0.169, p = 0.109	-0.095, p = 0.372	0.265, p = 0.011	Control component 2: Passive control	0.249, p = 0.018	0.141, p = 0.183	-0.152, p = 0.149	0.005, p = 0.964
Future MI threat	0.203, p = 0.054	**0.444, p < 0.001**	-0.142, p = 0.181	0.184, p = 0.093	Future MI threat	**0.271, p = 0.009**	0.224, p = 0.033	-0.143, p = 0.175	0.164, p = 0.121	Future MI threat	**0.317, p = 0.002**	**0.370, p < 0.001**	**-0.353, p = 0.001**	0.131, p = 0.216
Symptom perception	**0.549, p < 0.001**	**0.470, p < 0.001**	-0.183, p = 0.082	**0.461, p < 0.001**	Symptom perception	**0.586, p < 0.001**	**0.502, p < 0.001**	-0.230, p = 0.028	**0.529, p < 0.001**	Symptom perception	**0.475, p < 0.001**	**0.432, p < 0.001**	**-0.326, p = 0.002**	**0.392, p < 0.001**

(continued)

	Hospitalisation				4-8 weeks post-MI				6-month post-MI				
	Depression	State anxiety	Positive affect	Negative affect		Depression	State anxiety	Negative affect		Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress					Causal component 1 Stress	0.455***	0.406***	0.436***	Causal component 1: Stress	0.290**	0.348***		0.347***
Causal component 2: External					Causal component 2: External				Causal component 2: External				
Causal component 3: Lifestyle					Causal component 3 Lifestyle				Causal component 3: Lifestyle				
Consequence component 1: Physical	0.415***	0.338***		0.387***	Consequence component 1: Physical	0.459***	0.374***	0.382***	Consequence component 1: Physical	0.405***	0.409**8		0.295**
Consequence component 2: Emotional	0.429***	0.428**8		0.458***	Consequence component 2: Emotional	0.496***	0.467***	0.438***	Consequence component 2: Emotional	0.472***	0.496***	-0.272**	0.348***
Timeline	0.288**	0.434***			Timeline		0.293**		Timeline				
Control component 1: Active control					Control component 1: Active control				Control component 1: Active control			0.330***	
Control component 2: Passive control					Control component 2: Passive control	0.363***			Control component 2: Passive control			-	
Future MI threat		0.444***			Future MI threat	0.271**			Future MI threat	0.317**	0.370***	-0.353***	
Symptom perception	0.549***	0.470***		0.461***	Symptom perception	0.588***	0.502***	0.529***	Symptom perception	0.475***	0.432***	-0.326**	0.392***

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix C- 4. Correlations between the 91 MI patients' moods and illness perceptions over the first six months

In-hospital Patients' Illness perceptions	91 patients' moods at 4-8 weeks post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	0.254 p = 0.015	0.126 p = 0.235	-0.103 p = 0.329	0.216 p = 0.040
Causal component 2: External	-0.058 p = 0.585	-0.184 p = 0.081	0.138 p = 0.191	-0.046 p = 0.667
Causal component 3: Lifestyle	0.104 p = 0.325	-0.030 p = 0.780	-0.176 p = 0.094	0.092 p = 0.384
Consequence component 1: Physical	**0.396** **p < 0.001**	0.203 p = 0.054	-0.139 p = 0.189	**0.319** **p = 0.002**
Consequence component 2: Emotional	**0.468** **p < 0.001**	**0.362** **p < 0.001**	-0.199 p = 0.059	**0.398** **p < 0.001**
Timeline	0.255 p = 0.015	**0.278** **p = 0.008**	-0.250 p = 0.017	0.234 p = 0.026
Control component 1: Active control	0.103 p = 0.330	0.140 p = 0.186	-0.051 p = 0.630	0.165 p = 0.119
Control component 2: Passive control	0.093 p = 0.378	-0.011 p = 0.917	0.016 p = 0.880	0.054 p = 0.610
Future MI threat	**0.272** **p = 0.009**	0.241 p = 0.022	-0.163 p = 0.122	0.213 p = 0.043
Symptom perception	**0.406** **p < 0.001**	0.231 p = 0.028	**-0.292** **p = 0.005**	**0.330** **p = 0.001**

Hospitalisation Illness perceptions	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	0.152 p = 0.150	0.167 p = 0.114	-0.099 p = 0.351	0.212 p = 0.044
Causal component 2: External	-0.183 p = 0.082	**-0.287** **p = 0.006**	0.148 p = 0.160	-0.208 p = 0.048
Causal component 3: Lifestyle	0.054 p = 0.611	0.020 p = 0.850	-0.047 p = 0.660	0.066 p = 0.534
Consequence component 1: Physical	**0.296** **p = 0.004**	**0.273** **p = 0.009**	0.003 p = 0.981	0.152 p = 0.152
Consequence component 2: Emotional	**0.295** **p = 0.005**	**0.312** **p = 0.003**	-0.253 p = 0.016	0.254 p = 0.015
Timeline	0.149 p = 0.159	**0.279** **p = 0.007**	-0.218 p = 0.038	0.106 p = 0.317
Control component 1: Active control	0.146 p = 0.166	0.093 p = 0.379	0.073 p = 0.491	**0.307** **p = 0.003**
Control component 2: Passive control	0.059 p = 0.580	-0.089 p = 0.402	0.012 p = 0.909	-0.100 p = 0.346
Future MI threat	**0.294** **p = 0.005**	**0.361** **p < 0.001**	-0.211 p = 0.045	0.225 p = 0.032
Symptom perception	**0.363** **p < 0.001**	0.247 p = 0.018	-0.123 p = 0.247	**0.284** **p = 0.006**

4-8 weeks post-MI Illness perceptions	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	**0.318** **p = 0.002**	**0.332** **p = 0.001**	-0.240 p = 0.022	**0.365** **p < 0.001**
Causal component 2: External	0.116 p = 0.276	0.045 p = 0.670	-0.097 p = 0.360	0.133 p = 0.210
Causal component 3: Lifestyle	0.109 p = 0.305	0.081 p = 0.446	-0.069 p = 0.517	0.139 p = 0.189
Consequence component 1: Physical	**0.354** **p = 0.001**	**0.385** **p < 0.001**	-0.131 p = 0.217	0.177 p = 0.094
Consequence component 2: Emotional	**0.371** **p < 0.001**	0.437 p < 0.001	-0.180 p = 0.089	**0.298** **p = 0.004**
Timeline	0.219 p = 0.037	**0.368** **p < 0.001**	**-0.273** **p = 0.009**	0.246 p = 0.019
Control component 1: Active control	-0.050 p = 0.639	-0.022 p = 0.834	0.260 p = 0.013	0.016 p = 0.879
Control component 2: Passive control	**0.284** **p = 0.006**	0.096 p = 0.365	-0.145 p = 0.169	0.058 p = 0.584
Future MI threat	**0.336** **p = 0.001**	**0.352** **p = 0.001**	**-0.314** **p = 0.002**	0.178 p = 0.091
Symptom perception	**0.438** **p < 0.001**	**0.338** **p = 0.001**	-0.128 p = 0.226	**0.301** **p = 0.004**

(continued)

In-hospital patients' Illness perceptions	91 patients' moods at 4-8 weeks post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress				
Causal component 2: External				
Causal component 3: Lifestyle				
Consequence component 1: Physical	0.396 p < 0.001			0.319 p = 0.002
Consequence component 2: Emotional	0.468 p < 0.001	0.362 p < 0.001		0.398 p < 0.001
Timeline		0.278 p = 0.008		
Control component 1: Active control				
Control component 2: Passive control				
Future MI threat	0.272 p = 0.009			
Symptom perception	0.406 p < 0.001		-0.292 p = 0.005	0.330 p = 0.001

In-hospital patients' Illness perceptions	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress				
Causal component 2: External		-0.287 p = 0.006		
Causal component 3: Lifestyle				
Consequence component 1: Physical	0.296 p = 0.004	0.273 p = 0.009		
Consequence component 2: Emotional	0.295 p = 0.005	0.312 p = 0.003		
Timeline		0.279 p = 0.007		
Control component 1: Active control				0.307 p = 0.003
Control component 2: Passive control				
Future MI threat	0.294 p = 0.005	0.361 p < 0.001		
Symptom perception	0.363 p < 0.001			0.284 p = 0.006

4-8 weeks post-MI patients' Illness perceptions	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Causal component 1: Stress	0.318 p = 0.002	0.332 p = 0.001		0.365 p < 0.001
Causal component 2: External				
Causal component 3: Lifestyle				
Consequence component 1: Physical	0.354 p = 0.001	0.385 p < 0.001		
Consequence component 2: Emotional	0.371 p < 0.001	0.437 p < 0.001		0.298 p = 0.004
Timeline		0.368 p < 0.001	-0.273 p = 0.009	
Control component 1: Active control				
Control component 2: Passive control	0.284 p = 0.006			
Future MI threat	0.336 p = 0.001	0.352 p = 0.001	-0.314 p = 0.002	
Symptom perception	0.438 p < 0.001	0.338 p = 0.001		0.301 p = 0.004

Appendix C- 5. Correlations between the 91 MI patients' moods and social support after hospital discharge

4-8 weeks post-MI support	91 patients' moods at 4-8 weeks post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Total support	-0.243 p = 0.020	-0.229 p = 0.029	0.120 p = 0.258	-0.063 p = 0.555
Special one's support	-0.154 p = 0.145	-0.096 p = 0.364	0.060 p = 0.571	0.036 p = 0.737
Family support	-0.193 p = 0.067	-0.217 p = 0.038	0.152 p = 0.150	-0.055 p = 0.607
Friend support	-0.252 p = 0.016	-0.249 p = 0.017	0.063 p = 0.551	-0.154 p = 0.146
Available support	-0.219 p = 0.037	-0.148 p = 0.160	0.064 p = 0.548	-0.136 p = 0.198
Desired support	0.045 p = 0.672	0.039 p = 0.714	0.046 p = 0.664	0.079 p = 0.455
Available minus desired support	-0.257 p = 0.014	-0.182 p = 0.084	0.021 p = 0.842	-0.207 p = 0.049

6-months post-MI support	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Total support	-0.260 p = 0.013	**-0.276** **p = 0.008**	0.244 p = 0.020	-0.111 p = 0.297
Special one's support	-0.253 p = 0.016	-0.259 p = 0.013	**0.282** **p = 0.007**	0.012 p = 0.910
Family support	-0.185 p = 0.079	-0.200 p = 0.057	0.100 p = 0.344	-0.141 p = 0.183
Friend support	-0.229 p = 0.029	-0.251 p = 0.016	0.251 p = 0.016	-0.164 p = 0.120
Available support	-0.190 p = 0.072	-0.202 p = 0.055	0.202 p = 0.055	-0.113 p = 0.288
Desired support	-0.007 p = 0.946	0.019 p = 0.855	-0.003 p = 0.980	0.018 p = 0.866
Available minus desired support	-0.173 p = 0.102	-0.206 p = 0.050	0.192 p = 0.068	-0.121 p = 0.253

4-8 weeks post-MI support	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Total support	**-0.276** **p = 0.008**	-0.228 p = 0.030	0.209 p = 0.047	-0.148 p = 0.161
Special one's support	-0.185 p = 0.079	-0.166 p = 0.115	0.122 p = 0.247	-0.031 p = 0.771
Family support	**-0.276** **p = 0.008**	-0.220 p = 0.036	0.191 p = 0.070	-0.151 p = 0.153
Friend support	-0.200 p = 0.057	-0.153 p = 0.147	0.195 p = 0.064	-0.186 p = 0.077
Available support	-0.106 p = 0.318	-0.165 p = 0.118	0.170 p = 0.108	-0.053 p = 0.620
Desired support	0.111 p = 0.294	0.030 p = 0.780	0.061 p = 0.563	0.018 p = 0.867
Available minus desired support	-0.206 p = 0.050	-0.190 p = 0.071	0.112 p = 0.290	-0.068 p = 0.520

Appendix C- 6. Correlations between the 91 MI patients' moods and coping after hospital discharge

4-8 weeks post-MI coping strategy	91 patients' moods at 4-8 weeks post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Active	-0.117 p = 0.271	-0.201 p = 0.055	**0.333** **p = 0.001**	-0.004 p = 0.972
Denial	**0.300** **p = 0.004**	0.160 p = 0.130	-0.011 p = 0.920	**0.388** **p < 0.001**
Substance	**0.326** **p = 0.002**	0.238 p = 0.023	-0.156 p = 0.139	0.244 p = 0.020
Emotional support	0.015 p = 0.886	0.007 p = 0.944	-0.057 p = 0.594	0.076 p = 0.474
Disengage	**0.277** **p = 0.008**	0.255 p = 0.015	-0.028 p = 0.792	**0.320** **p = 0.002**
Positive reframing	-0.065 p = 0.538	-0.055 p = 0.608	**0.380** **p < 0.001**	0.081 p = 0.444
Distraction	0.234 p = 0.026	0.019 p = 0.856	-0.097 p = 0.360	0.155 p = 0.141
Venting	**0.371** **p < 0.001**	0.193 p = 0.067	-0.071 p = 0.505	**0.323** **p = 0.002**
Instrumental support	0.127 p = 0.229	-0.057 p = 0.591	0.009 p = 0.936	0.084 p = 0.430
Acceptance	-0.042 p = 0.690	-0.203 p = 0.053	0.225 p = 0.032	-0.077 p = 0.470
Self blame	**0.411** **p < 0.001**	0.258 p = 0.013	0.023 p = 0.831	**0.390** **p < 0.001**
Religion	0.215 p = 0.041	0.045 p = 0.673	0.004 p = 0.972	**0.266** **p = 0.010**
Humour	0.009 p = 0.932	-0.001 p = 0.991	0.218 p = 0.038	0.032 p = 0.766
Planning	0.211 p = 0.044	0.203 p = 0.054	-0.053 p = 0.619	**0.286** **p = 0.006**

6-month post-MI coping strategy	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Active	-0.003 p = 0.974	-0.089 p = 0.402	0.154 p = 0.145	0.025 p = 0.815
Denial	**0.351** **p = 0.001**	0.179 p = 0.089	-0.195 p = 0.063	**0.314** **p = 0.002**
Substance	0.238 p = 0.023	0.198 p = 0.059	-0.156 p = 0.140	0.196 p = 0.063
Emotional support	0.062 p = 0.560	-0.099 p = 0.348	0.118 p = 0.264	0.076 p = 0.472
Disengage	**0.356** **p = 0.001**	**0.329** **p = 0.001**	-0.139 p = 0.188	**0.407** **p < 0.001**
Positive reframing	0.127 p = 0.232	0.077 p = 0.470	0.136 p = 0.200	0.091 p = 0.391
Distraction	0.199 p = 0.058	0.006 p = 0.956	-0.076 p = 0.473	0.229 p = 0.029
Venting	**0.428** **p < 0.001**	**0.310** **p = 0.003**	-0.196 p = 0.062	**0.403** **p < 0.001**
Instrumental support	0.178 p = 0.091	0.025 p = 0.812	-0.004 p = 0.968	0.178 p = 0.091
Acceptance	-0.002 p = 0.985	-0.087 p = 0.410	0.145 p =0.171	-0.106 p = 0.319
Self blame	**0.456** **p < 0.001**	**0.329** **p = 0.001**	-0.186 p = 0.078	**0.393** **p < 0.001**
Religion	**0.302** **p = 0.004**	0.153 p = 0.146	-0.032 p = 0.764	**0.290** **p = 0.005**
Humour	0.121 p = 0.255	0.135 p = 0.203	0.097 p = 0.363	0.021 p = 0.843
Planning	**0.290** **p = 0.005**	0.220 p = 0.036	0.035 p = 0.744	**0.338** **p = 0.001**

4-8 weeks post-MI coping strategy	91 patients' moods at 6-month post-MI			
	Depression	State anxiety	Positive affect	Negative affect
Active	-0.197 p = 0.061	-0.145 p = 0.171	0.137 p = 0.194	-0.015 p = 0.889
Denial	0.139 p = 0.189	0.124 p = 0.242	-0.082 p = 0.438	0.207 p = 0.049
Substance	0.209 p = 0.046	0.169 p = 0.110	-0.215 p = 0.041	0.179 p = 0.090
Emotional support	0.060 p = 0.572	0.008 p = 0.940	-0.032 p = 0.760	0.047 p = 0.656
Disengage	0.195 p = 0.064	0.132 p = 0.212	0.008 p = 0.940	**0.353** **p = 0.001**
Positive reframing	-0.136 p = 0.200	-0.171 p = 0.104	0.172 p = 0.102	-0.049 p = 0.647
Distraction	0.134 p = 0.206	0.106 p = 0.316	-0.193 p = 0.067	0.130 p = 0.219
Venting	0.171 p = 0.105	0.142 p = 0.180	-0.086 p = 0.416	0.226 p = 0.031
Instrumental support	0.044 p = 0.676	0.074 p = 0.484	-0.135 p = 0.203	0.101 p = 0.339
Acceptance	-0.154 p = 0.145	-0.162 p = 0.126	0.139 p = 0.188	-0.109 p = 0.302
Self blame	0.254 p = 0.015	0.177 p = 0.093	-0.141 p = 0.184	0.230 p = 0.028
Religion	0.173 p = 0.101	0.042 p = 0.695	0.034 p = 0.752	0.222 p = 0.035
Humour	-0.031 p = 0.770	-0.005 p = 0.959	0.053 p = 0.615	0.091 p = 0.391
Planning	0.151 p = 0.153	0.214 p = 0.042	-0.081 p = 0.447	0.160 p = 0.129

(continued)

4-8 weeks post MI	91 patients' moods at 4-8 weeks post-MI				6-months post-MI	91 patients' moods at 6-month post-MI			
Coping strategy	Depression	State anxiety	Positive affect	Negative affect	Coping strategy	Depression	State anxiety	Positive affect	Negative affect
Active			0.333***		Active				
Denial	0.300**			0.388***	Denial	0.351***			0.314**
Substance	0.326**				Substance				
Emotional support					Emotional support				
Disengage	0.277**			0.320**	Disengage	0.356***	0.329***		0.407***
Positive reframing			0.380***		Positive reframing				
Distraction					Distraction				
Venting	0.371***			0.323**	Venting	0.428***	0.310**		0.403***
Instrumental support					Instrumental support				
Acceptance					Acceptance				
Self blame	0.411***			0.390***	Self blame	0.456***	0.329***		0.393***
Religion				0.266**	Religion	0.302**			0.290**
Humour					Humour				
Planning				0.286**	Planning	0.290**			0.338**

*** $p < 0.001$; ** $p < 0.01$

Appendix C- 7. Correlations of the 91 MI patients' moods and illness perceptions with social support and coping at 4-8 weeks post-MI

	91 patients' moods, illness perceptions, social support and coping at 4-8 weeks post-MI				
4-8 weeks post-MI	Depression	State anxiety	Positive affect	Negative affect	Causal component 1: Stress
Social support –					
Total support	-0.243 (p = 0.020)	-0.229 (p = 0.029)	0.120 (p = 0.258)	-0.063 (p = 0.555)	-0.233 (p = 0.026)
Special support	-0.154 (p = 0.145)	-0.096 (p = 0.364)	0.060 (p = 0.571)	0.036 (p = 0.737)	-0.203 (p = 0.053)
Family support	-0.193 (p = 0.067)	-0.217 (p = 0.038)	0.152 (p = 0.150)	-0.055 (p = 0.607)	-0.144 (p = 0.172)
Friend support	-0.252 (p = 0.016)	-0.249 (p = 0.017)	0.063 (p = 0.551)	-0.154 (p = 0.146)	-0.231 (p = 0.027)
Available support	-0.219 (p = 0.037)	-0.148 (p = 0.160)	0.064 (p = 0.548)	-0.136 (p = 0.198)	0.051 (p = 0.632)
Desired support	0.045 (p = 0.672)	0.039 (p = 0.714)	0.046 (p = 0.664)	0.079 (p = 0.455)	0.118 (p = 0.265)
Available/desired	-0.194 (p = 0.067)	-0.112 (p = 0.295)	0.125 (p = 0.239)	-0.128 (p = 0.229)	0.102 (p = 0.339)
Available- desired	-0.257 (p = 0.014)	-0.182 (p = 0.084)	0.021 (p = 0.842)	-0.207 (p = 0.049)	-0.057 (p = 0.592)
Marriage satisfaction	-0.269 (p = 0.056)	-0.157 (p = 0.272)	0.279 (p = 0.047)	-0.177 (p = 0.214)	-0.263 (p = 0.683)
Coping –					
Coping – active	-0.117 (p = 0.271)	-0.201 (p = 0.055)	0.333** (p = 0.001)	-0.004 (p = 0.972)	-0.015 (p = 0.887)
Denial	0.300** (p = 0.004)	0.160 (p = 0.130)	-0.011 (p = 0.920)	0.388** (p < 0.001)	0.129 (p = 0.221)
Substance abuse	0.326** (p = 0.002)	0.238 (p = 0.023)	-0.156 (p = 0.139)	0.244 (p = 0.020)	0.084 (p = 0.426)
Accept emotional support	0.015 (p = 0.886)	0.007 (p = 0.944)	-0.057 (p = 0.594)	0.076 (p = 0.474)	-0.038 (p = 0.721)
Behavioural disengagement	0.277** (p = 0.008)	0.255 (p = 0.015)	-0.028 (p = 0.792)	0.320** (p = 0.002)	0.081 (p = 0.446)
Positive reframing	-0.065 (p = 0.538)	-0.055 (p = 0.608)	0.380** (p < 0.001)	0.081 (p = 0.444)	0.004 (p = 0.973)
Self-distraction	0.234 (p = 0.026)	0.019 (p = 0.856)	-0.097 (p = 0.360)	0.155 (p = 0.141)	0.268** (p = 0.010)
Venting	0.371** (p < 0.001)	0.193 (p = 0.067)	-0.071 (p = 0.505)	0.323** (p = 0.002)	0.110 (p = 0.298)
Accept instrumental support	0.127 (p = 0.229)	-0.057 (p = 0.591)	0.009 (p = 0.936)	0.084 (p = 0.430)	0.080 (p = 0.449)
Acceptance	-0.042 (p = 0.690)	-0.203 (p = 0.053)	0.225 (p = 0.032)	-0.077 (p = 0.470)	-0.051 (p = 0.630)
Self-blame	0.411** (p < 0.001)	0.258 (p = 0.013)	0.023 (p = 0.831)	0.390** (p < 0.001)	0.400** (p < 0.001)
Religion	0.215 (p = 0.041)	0.045 (p = 0.673)	0.004 (p = 0.972)	0.266** (p = 0.010)	0.162 (p = 0.125)
Humour	0.009 (p = 0.932)	-0.001 (p = 0.991)	0.218 (p = 0.038)	0.032 (p = 0.766)	0.137 (p = 0.195)
Planning	0.211 (p = 0.044)	0.203 (p = 0.054)	-0.053 (p = 0.619)	0.286** (p = 0.006)	0.232 (p = 0.027)

** $p \leq 0.01$

(continued)

	91 patients' moods, illness perceptions, social support and coping at 4-8 weeks post-MI				
4-8 weeks post-MI	Causal component 2: external/uncontrollable	Causal component 3: Unhealthy lifestyles	Consequence component 1: Physical consequences	Consequence component 2: Emotional consequences	Timeline
Social support –					
Total support	0 017 (p = 0 871)	-0 149 (p = 0 159)	-0 258 (p = 0 014)	-0 195 (p = 0 064)	-0 285** (p = 0 006)
Special support	-0 011 (p = 0 915)	-0 119 (p = 0 262)	-0 200 (p = 0 058)	-0 089 (p = 0 402)	-0 104 (p = 0 328)
Family support	0 028 (p = 0 792)	-0 050 (p = 0 639)	-0 163 (p = 0 123)	-0 155 (p = 0 143)	-0 273** (p = 0 009)
Friend support	0 026 (p = 0 808)	-0 222 (p = 0 034)	-0 282** (p = 0 007)	-0 247 (p = 0 018)	-0 326** (p = 0 002)
Available support	-0 146 (p = 0 168)	0 034 (p = 0 749)	-0 191 (p = 0 058)	-0 173 (p = 0 101)	-0 133 (p = 0 208)
Desired support	-0 020 (p = 0 852)	0 035 (p = 0 745)	0 039 (p = 0 717)	0 026 (p = 0 806)	-0 155 (p = 0 143)
Available/desired	0 014 (p = 0 896)	0 078 (p = 0 463)	-0 089 (p = 0 405)	-0 074 (p = 0 489)	0 056 (p = 0 597)
Available- desired	-0 126 (p = 0 232)	0 002 (p = 0 982)	-0 232 (p = 0 027)	-0 195 (p = 0 064)	0 009 (p = 0 936)
Marriage satisfaction	-0 059 (p = 0 683)	-0 116 (p = 0 418)	-0 152 (p = 0 288)	-0 113 (p = 0 430)	-0 115 (p = 0 422)
Coping –					
Coping – active	-0 077 (p = 0 469)	-0 009 (p = 0 935)	0 018 (p = 0 865)	0 064 (p = 0 549)	-0 183 (p = 0 084)
Denial	0 151 (p = 0 153)	-0 100 (p = 0 346)	0 140 (p = 0 184)	0 175 (p = 0 096)	-0 064 (p = 0 548)
Substance abuse	-0 048 (p = 0 654)	-0 039 (p = 0 715)	0 040 (p = 0 705)	0 055 (p = 0 606)	0 083 (p = 0 436)
Accept emotional support	-0 142 (p = 0 179)	-0 083 (p = 0 435)	-0 061 (p = 0 563)	0 148 (p = 0 163)	-0 086 (p = 0 416)
Behavioural disengagement	-0 109 (p = 0 303)	-0 164 (p = 0 120)	0 008 (p = 0 938)	0 155 (p = 0 141)	0 089 (p = 0 399)
Positive reframing	0 157 (p = 0 136)	-0 089 (p = 0 403)	0 162 (p = 0 124)	0 071 (p = 0 504)	-0 184 (p = 0 080)
Self-distraction	0 026 (p = 0 807)	0 185 (p = 0 079)	0 148 (p = 0 162)	0 181 (p = 0 086)	-0 120 (p = 0 257)
Venting	0 021 (p = 0 841)	-0 139 (p = 0 189)	0 095 (p = 0 371)	0 207 (p = 0 049)	-0 006 (p = 0 956)
Accept instrumental support	0 078 (p = 0 464)	0 037 (p = 0 728)	0 049 (p = 0 645)	0 158 (p = 0 134)	-0 104 (p = 0 328)
Acceptance	-0 118 (p = 0 266)	-0 058 (p = 0 588)	-0 010 (p = 0 922)	0 023 (p = 0 829)	0 022 (p = 0 833)
Self-blame	0 084 (p = 0 428)	0 169 (p = 0 109)	0 159 (p = 0 133)	0 199 (p = 0 058)	-0 048 (p = 0 654)
Religion	0 189 (p = 0 073)	0 019 (p = 0 856)	0 008 (p = 0 937)	0 069 (p = 0 514)	-0 192 (p = 0 069)
Humour	-0 102 (p = 0 338)	0 244 (p = 0 020)	0 209 (p = 0 047)	0 074 (p = 0 485)	0 029 (p = 0 787)
Planning	-0 110 (p = 0 300)	0 246 (p = 0 019)	0 306** (p = 0 003)	0 241 (p = 0 021)	-0 003 (p = 0 975)

** $p \leq 0.01$

(continued)

	91 patients' moods, illness perceptions, social support and coping at 4-8 weeks post-MI			
4-8 weeks post-MI	Control component 1: Active control	Control component 2: Passive control	Future MI threat	Symptom perception
Social support –				
Total support	0.082 (p = 0.439)	-0.076 (p = 0.474)	-0.299** (p = 0.004)	-0.153 (p = 0.147)
Special support	-0.012 (p = 0.912)	-0.077 (p = 0.468)	-0.296** (p = 0.004)	-0.121 (p = 0.254)
Family support	0.159 (p = 0.133)	-0.071 (p = 0.506)	-0.143 (p = 0.175)	-0.046 (p = 0.663)
Friend support	0.033 (p = 0.758)	-0.028 (p = 0.793)	-0.312** (p = 0.003)	-0.238 (p = 0.023)
Available support	-0.018 (p = 0.864)	-0.218 (p = 0.038)	-0.188 (p = 0.075)	0.019 (p = 0.857)
Desired support	0.132 (p = 0.213)	0.052 (p = 0.627)	-0.170 (p = 0.108)	0.121 (p = 0.254)
Available/desired	-0.180 (p = 0.090)	-0.204 (p = 0.054)	0.047 (p = 0.6600	-0.081 (p = 0.447)
Available- desired	-0.138 (p = 0.193)	-0.262 (p = 0.012)	-0.032 (p = 0.764)	-0.090 (p = 0.394)
Marriage satisfaction	0.003 (p = 0.982)	-0.019 (p = 0.898)	-0.217 (p = 0.126)	-0.239 (p = 0.091)
Coping –				
Coping – active	0.116 (p = 0.272)	0.034 (p = 0.749)	-0.215 (p = 0.041)	-0.042 (p = 0.693)
Denial	-0.050 (p = 0.635)	0.304** (p = 0.003)	-0.086 (p = 0.418)	0.014 (p = 0.895)
Substance abuse	-0.125 (p = 0.238)	-0.036 (p = 0.731)	0.086 (p = 0.416)	0.234 (p = 0.026)
Accept emotional support	-0.043 (p = 0.687)	0.063 (p = 0.554)	-0.114 (p = 0.282)	0.070 (p = 0.507)
Behavioural disengagement	-0.115 (p = 0.277)	0.015 (p = 0.886)	0.098 (p = 0.357)	0.076 (p = 0.474)
Positive reframing	0.227 (p = 0.031)	0.096 (p = 0.364)	-0.140 (p = 0.187)	0.134 (p = 0.204)
Self-distraction	0.043 (p = 0.683)	0.189 (p = 0.073)	-0.098 (p = 0.358)	0.081 (p = 0.445)
Venting	-0.012 (p = 0.913)	0.236 (p = 0.024)	0.065 (p = 0.542)	0.180 (p = 0.088)
Accept instrumental support	0.071 (p = 0.503)	0.166 (p = 0.116)	0.001 (p = 0.997)	0.018 (p = 0.866)
Acceptance	-0.023 (p = 0.832)	-0.151 (p = 0.152)	-0.202 (p = 0.055)	0.056 (p = 0.599)
Self-blame	0.224 (p = 0.033)	0.191 (p = 0.069)	0.028 (p = 0.796)	0.243 (p = 0.020)
Religion	0.070 (p = 0.509)	0.254 (p = 0.015)	-0.078 (p = 0.463)	0.094 (p = 0.378)
Humour	0.198 (p = 0.060)	-0.037 (p = 0.730)	-0.036 (p = 0.736)	0.123 (p = 0.244)
Planning	0.145 (p = 0.169)	0.067 (p = 0.529)	-0.126 (p = 0.233)	0.228 (p = 0.030)

** $p \leq 0.01$

Appendix C- 8. Correlations of the 91 MI patients' moods and illness perceptions with social support and coping at 6-month post-MI

6-month post-MI	91 patients' moods, illness perceptions, social support and coping at 6-month post-MI				
	Depression	State anxiety	Positive affect	Negative affect	Causal component 1: stress
Social support –					
Total support	-0.260 (p = 0.013)	-0.276** (p = 0.008)	0.244 (p = 0.020)	-0.111 (p = 0.297)	-0.192 (p = 0.069)
Special support	-0.253 (p = 0.016)	-0.259 (p = 0.013)	0.282** (p = 0.008)	0.012 (p = 0.910)	-0.130 (p = 0.219)
Family support	-0.185 (p = 0.079)	-0.200 (p = 0.057)	0.100 (p = 0.344)	-0.141 (p = 0.183)	-0.093 (p = 0.383)
Friend support	-0.229 (p = 0.029)	-0.251 (p = 0.016)	0.251 (p = 0.016)	-0.164 (p = 0.120)	-0.288** (p = 0.006)
Available support	-0.190 (p = 0.072)	-0.202 (p = 0.055)	0.202 (p = 0.055)	-0.113 (p = 0.288	-0.007 (p = 0.950)
Desired support	-0.007 (p = 0.946)	0.019 (p = 0.855)	-0.003 (p = 0.980)	0.018 (p = 0.866)	0.106 (p = 0.318)
Available/desired support	-0.118 (p = 0.268)	-0.105 (p = 0.323)	0.106 (p = 0.320)	-0.118 (p = 0.269)	-0.102 (p = 0.341)
Available – desired support	0.170 (p = 0.107)	-0.202 (p = 0.055)	0.195 (p = 0.064)	-0.120 (p = 0.255)	-0.096 (p = 0.365)
Coping –					
Coping – active	-0.003 (p = 0.974)	-0.089 (p = 0.402)	0.154 (p = 0.145)	0.025 (p = 0.815)	-0.033 (p = 0.753)
Denial	0.351** (p = 0.001)	0.179 (p = 0.089)	-0.195 (p = 0.063)	0.314** (p = 0.002)	0.276** (p = 0.008)
Substance abuse	0.238 (p = 0.023)	0.198 (p = 0.059)	-0.156 (p = 0.140)	0.196 (p = 0.063)	0.146 (p = 0.168)
Accept emotional support	0.062 (p = 0.560)	-0.099 (p = 0.348)	0.118 (p = 0.264)	0.076 (p = 0.472)	-0.115 (p = 0.276)
Behavioural disengagement	0.356** (p = 0.001)	0.329** (p = 0.001)	-0.139 (p = 0.188)	0.407** (p < 0.001)	0.185 (p = 0.080)
Positive reframing	0.127 (p = 0.232)	0.077 (p = 0.470)	0.136 (p = 0.200)	0.091 (p = 0.391)	-0.025 (p = 0.811)
Self-distraction	0.199 (p = 0.058)	0.006 (p = 0.956)	-0.076 (p = 0.473)	0.229 (p = 0.029)	0.079 (p = 0.456)
Venting	0.428** (p < 0.001)	0.310** (p = 0.003)	-0.196 (p = 0.062)	0.403** (p < 0.001)	0.138 (p = 0.192)
Accept instrumental support	0.178 (p = 0.091)	0.025 (p = 0.812)	-0.004 (p = 0.968)	0.178 (p = 0.091)	-0.028 (p = 0.795)
Acceptance	-0.002 (p = 0.985)	-0.087 (p = 0.410)	0.145 (p = 0.171)	-0.106 (p = 0.319)	-0.025 (p = 0.811)
Self-blame	0.456** (p < 0.001)	0.329** (p = 0.001)	-0.186 (p = 0.078)	0.393** (p < 0.001)	0.257 (p = 0.014)
Religion	0.302** (p = 0.004)	0.153 (p = 0.146)	-0.032 (p = 0.764)	0.290** (p = 0.005)	0.007 (p = 0.950)
Humour	0.121 (p = 0.255)	0.135 (p = 0.203)	0.097 (p = 0.363)	0.021 (p = 0.843)	-0.023 (p = 0.826)
Planning	0.290** (p = 0.005)	0.220 (p = 0.036)	0.035 (p = 0.744)	0.338** (p = 0.001)	0.187 (p = 0.076)

** $p \leq 0.01$

(continued)

6-month post-MI	91 patients' moods, illness perceptions, social support and coping at 6-month post-MI				
	Causal component 2: external causes	Causal component 3: unhealthy lifestyles	Consequence component 1: Physical consequences	Consequence component 2: Emotional consequences	Timeline
Social support –					
Total support	-0.176 (p = 0.094)	0.158 (p = 0.134)	-0.022 (p = 0.835)	-0.082 (p = 0.437)	-0.128 (p = 0.226)
Special support	-0.083 (p = 0.432)	0.129 (p = 0.222)	-0.026 (p = 0.810)	0.017 (p = 0.875)	-0.091 (p = 0.388)
Family support	-0.117 (p = 0.269)	0.247 (p = 0.018)	0.144 (p = 0.172)	0.029 (p = 0.787)	-0.066 (p = 0.537)
Friend support	-0.270** (p = 0.010)	0.009 (p = 0.931)	-0.207 (p = 0.049)	-0.292** (p = 0.005)	-0.183 (p = 0.082)
Available support	-0.004 (p = 0.970)	0.064 (p = 0.544)	-0.118 (p = 0.263)	-0.155 (p = 0.143)	-0.048 (p = 0.649)
Desired support	0.100 (p = 0.347)	-0.050 (p = 0.640)	-0.074 (p = 0.488)	-0.064 (p = 0.545)	-0.043 (p = 0.683)
Available/desired support	-0.090 (p = 0.400)	0.072 (p = 0.503)	-0.101 (p = 0.342)	-0.052 (p = 0.625)	-0.014 (p = 0.893)
Available – desired support	-0.089 (p = 0.401)	0.105 (p = 0.320)	-0.048 (p = 0.652)	-0.085 (p = 0.425)	0.000 (p = 0.997)
Coping –					
Coping – active	-0.001 (p = 0.995)	-0.024 (p = 0.822)	0.066 (p = 0.536)	-0.036 (p = 0.734)	-0.189 (p = 0.072)
Denial	0.271** (p = 0.009)	0.169 (p = 0.108)	0.184 (p = 0.081)	0.246 (p = 0.019)	-0.191 (p = 0.069)
Substance abuse	0.021 (p = 0.843)	0.117 (p = 0.268)	0.112 (p = 0.292)	0.017 (p = 0.875)	-0.010 (p = 0.926)
Accept emotional support	-0.142 (p = 0.178)	0.039 (p = 0.711)	0.038 (p = 0.721)	-0.011 (p = 0.918)	-0.180 (p = 0.088)
Behavioural disengagement	0.065 (p = 0.540)	-0.131 (p = 0.217)	0.221 (p = 0.035)	0.145 (p = 0.169)	0.080 (p = 0.452)
Positive reframing	0.091 (p = 0.392)	0.025 (p = 0.814)	0.127 (p = 0.230)	0.081 (p = 0.445)	-0.303** (p = 0.004)
Self-distraction	0.009 (p = 0.932)	0.008 (p = 0.942)	0.030 (p = 0.780)	0.007 (p = 0.949)	-0.109 (p = 0.302)
Venting	0.178 (p = 0.092)	-0.078 (p = 0.461)	0.244 (p = 0.020)	0.257 (p = 0.014)	-0.051 (p = 0.632)
Accept instrumental support	-0.139 (p = 0.189)	-0.018 (p = 0.866)	0.096 (p = 0.363)	0.033 (p = 0.755)	0.031 (p = 0.774)
Acceptance	-0.193 (p = 0.067)	-0.004 (p = 0.969)	-0.082 (p = 0.437)	-0.101 (p = 0.339)	-0.060 (p = 0.573)
Self-blame	0.258 (p = 0.014)	0.028 (p = 0.791)	0.127 (p = 0.229)	0.156 (p = 0.141)	-0.118 (p = 0.267)
Religion	0.182 (p = 0.084)	-0.087 (p = 0.411)	0.188 (p = 0.074)	0.130 (p = 0.218)	-0.190 (p = 0.071)
Humour	-0.003 (p = 0.977)	0.214 (p = 0.042)	0.218 (p = 0.038)	0.019 (p = 0.859)	0.017 (p = 0.870)
Planning	0.001 (p = 0.994)	0.244 (p = 0.020)	0.191 (p = 0.069)	0.185 (p = 0.080)	-0.143 (p = 0.177)

** $p \leq 0.01$

(continued)

6-month post-MI	91 patients' moods, illness perceptions, social support and coping at 6-month post-MI			
	Control component 1: Active control	Control component 2: Passive control	Future MI threat	Symptom perception
Social support –				
Total support	0.298** (p = 0.004)	0.043 (p = 0.686)	-0.167 (p = 0.114)	-0.106 (p = 0.315)
Special support	0.256 (p = 0.014)	-0.024 (p = 0.820)	-0.133 (p = 0.210)	-0.071 (p = 0.504)
Family support	0.178 (p = 0.091)	0.190 (p = 0.071)	-0.135 (p = 0.203)	-0.072 (p = 0.497)
Friend support	0.345** (p = 0.001)	-0.076 (p = 0.476)	-0.164 (p = 0.120)	-0.137 (p = 0.195)
Available support	0.209 (p = 0.047)	0.086 (p = 0.417)	-0.168 (p = 0.112)	-0.153 (p = 0.148)
Desired support	0.219 (p = 0.037)	0.150 (p = 0.155)	-0.078 (p = 0.464)	-0.117 (p = 0.268)
Available/desired support	-0.098 (p = 0.357)	-0.080 (p = 0.456)	-0.014 (p = 0.896)	0.077 (p = 0.470)
Available – desired support	0.013 (p = 0.905)	-0.049 (p = 0.643)	-0.089 (p = 0.403)	-0.039 (p = 0.710)
Coping –				
Coping – active	0.367** (p < 0.001)	-0.060 (p = 0.574)	-0.262 (p = 0.012)	-0.170 (p = 0.107)
Denial	0.048 (p = 0.650)	0.239 (p = 0.023)	0.013 (p = 0.903)	0.150 (p = 0.155)
Substance abuse	-0.002 (p = 0.986)	-0.027 (p = 0.802)	-0.121 (p = 0.255)	0.341** (p = 0.001)
Accept emotional support	0.192 (p = 0.069)	0.065 (p = 0.538)	-0.166 (p = 0.115)	-0.001 (p = 0.993)
Behavioural disengagement	-0.101 (p = 0.339)	0.105 (p = 0.324)	0.159 (p = 0.133)	0.306** (p = 0.003)
Positive reframing	0.273** (p = 0.009)	0.018 (p = 0.865)	-0.209 (p = 0.047)	-0.092 (p = 0.388)
Self-distraction	0.204 (p = 0.052)	0.224 (p = 0.033)	0.105 (p = 0.323)	-0.005 (p = 0.959)
Venting	-0.038 (p = 0.719)	0.238 (p = 0.023)	0.163 (p = 0.122)	0.227 (p = 0.030)
Accept instrumental support	0.146 (p = 0.167)	0.057 (p = 0.593)	0.023 (p = 0.830)	0.061 (p = 0.565)
Acceptance	0.174 (p = 0.100)	-0.135 (p = 0.200)	-0.113 (p = 0.286)	-0.215 (p = 0.041)
Self-blame	0.113 (p = 0.286)	0.033 (p = 0.753)	0.070 (p = 0.510)	0.121 (p = 0.252)
Religion	0.014 (p = 0.897)	0.276** (p = 0.008)	-0.065 (p = 0.542)	0.025 (p = 0.814)
Humour	0.144 (p = 0.173)	-0.044 (p = 0.677)	0.006 (p = 0.952)	0.151 (p = 0.153)
Planning	0.245 (p = 0.019)	-0.007 (p = 0.948)	-0.063 (p = 0.554)	0.162 (p = 0.124)

** $p \leq 0.01$

Appendix C- 9. The full results of independent t-tests between depressed and not depressed MI patients during patients' hospitalisation

During patients' hospitalisation	43 depressed (SD)	48 not depressed (SD)	Depressed – not depressed (99% CI)	t	p
Causal attribution component 1: Stress	2.88 (0.79)	2.69 (0.74)	0.19 (-0.23 – 0.61)	1.187	0.238
Causal attribution component 2: Uncontrollable (external) causes	2.67 (0.64)	2.69 (0.74)	-0.02 (-0.41 – 0.36)	-0.165	0.869
Causal attribution component 3: Unhealthy lifestyles/behaviours	3.05 (0.85)	2.90 (0.80)	0.14 (-0.31 – 0.60)	0.828	0.410
Consequence component 1: Physical consequences	3.38 (0.65)	2.82 (0.67)	0.55 (0.19 – 0.92)	3.988	< 0.001
Consequence component 2: Emotional consequences	3.58 (0.57)	3.12 (0.66)	0.46 (0.12 – 0.80)	3.534	0.001
Timeline	3.23 (0.72)	2.94 (0.74)	0.29 (-0.12 – 0.69)	1.871	0.065
Control component 1: Active control	4.04 (0.62)	3.97 (0.47)	0.07 (-0.23 – 0.37)	0.626	0.533
Control component 2: Passive control	2.65 (0.72)	2.63 (0.74)	0.02 (-0.38 – 0.43)	0.136	0.892
Symptom perception	13.02 (7.56)	6.94 (5.11)	6.09 (2.46 – 9.71)	4.446	< 0.001
Future MI threat	3.19 (1.05)	2.90 (102)	0.29 (-0.28 – 0.86)	1.338	0.184

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix C- 10. The full results of independent t-tests between anxious and not anxious MI patients during patients' hospitalisation

During patients' hospitalisation	19 anxious (SD)	72 not anxious (SD)	Anxious – not anxious (99% CI)	t	p
Causal attribution component 1: Stress	2.97 (0.94)	2.73 (0.71)	0.24 (-0.28 – 0.75)	1.205	0.231
Causal attribution component 2: Uncontrollable (external) causes	2.59 (0.62)	2.70 (0.71)	-0.11 (-0.58 – 0.36)	-0.63	0.530
Causal attribution component 3: Unhealthy lifestyles/behaviours	3.08 (0.76)	2.92 (0.83)	0.26 (-0.29 – 0.82)	1.237	0.219
Consequence component 1: Physical consequences	3.37 (0.66)	3.01 (0.71)	0.36 (-0.12 – 0.84)	1.989	.050
Consequence component 2: Emotional consequences	3.75 (0.54)	3.23 (065)	0.52 (0.09 – 0.94)	3.213	0.002
Timeline	3.52 (0.69)	2.96 (0.71)	0.55 (0.07 – 1.03)	3.042	0.003
Control component 1: Active control	3.96 (0.69)	4.01 (0.51)	-0.05 (-0.53 – 0.42)	-0.314	0.756
Control component 2: Passive control	2.78 (0.90)	2.60 (0.68)	0.17 (-0.45 – 0.79)	0.779	0.443
Symptom perception	15.95 (6.94)	8.19 (6.16)	7.75 (3.46 – 12.05)	4.750	< 0.001
Future MI threat	3.63 (0.90)	2.88 (1.02)	0.76 (0.08 – 1.43)	2.945	0.004

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix C- 11. The full results of independent t-tests between depressed and not depressed MI patients at 4-8 weeks post-MI

At 4-8 weeks post-MI	32 depressed (SD)	59 not depressed (SD)	Depressed – not depressed (99% CI)	t	p
Causal attribution component 1: Stress	3.16 (0.67)	2.51 (0.77)	0.65 (0.22 – 1.08)	4.011	< 0.001
Causal attribution component 2: Uncontrollable (external) causes	2.56 (0.70)	2.70 (0.70)	-0.14 (-0.54 – 0.27)	-0.892	0.375
Causal attribution component 3: Unhealthy lifestyles/behaviours	3.16 (0.70)	2.96 (0.79)	0.20 (-0.24 – 0.64)	1.198	0.234
Consequence component 1: Physical consequences	3.24 (0.73)	2.80 (0.55)	0.44 (0.08 – 0.79)	3.198	0.002
Consequence component 2: Emotional consequences	3.52 (0.65)	2.93 (0.60)	0.59 (0.23 – 0.94)	4.324	< 0.001
Timeline	3.23 (0.68)	2.97 (0.60)	0.25 (-0.11 – 0 62)	1.815	0.073
Control component 1: Active control	3.87 (0.51)	3.92 (0.53)	-0.05 (-0.35 – 0.25)	-0.421	0.675
Control component 2: Passive control	2.67 (0.64)	2.45 (0.53)	0.22 (-0.11 – 0.55)	1.788	0.077
Symptom perception	15.47 (7.22)	8.58 (5.68)	6.89 (2.95 – 10.83)	5.018	< 0.001
Future MI threat	3.22 (0.91)	2.78 (0.87)	0.44 (-0.07 – 0.95)	2.262	0.026
Perceived total support	65.16 (13.56)	70.93 (10.37)	-5.77 (-12.47 – 0.92)	-2.272	0.025
Special one's support	22.25 (5.98)	23.86 (4.37)	-1.61 (-4.50 – 1.27)	-1.473	0.144
Family support	21.38 (6.60)	24.05 (4.93)	-2.67 (-5.90 – 0.54)	-2.188	0.031
Friends' support	21.53 (3.99)	23.02 (3.91)	-1.49 (-3.76 – 0.79)	-1.719	0.089
Active coping	3.66 (1.64)	3.93 (1.67)	-0.27 (-1.24 – 0.68)	-0.758	0.451
Denial	2.63 (2.25)	1.41 (1.97)	1.22 (0.02 – 2.42)	2.679	0.009
Substance abuse	0.75 (1.59)	0.22 (0.89)	0.53 (-0.29 – 1.35)	1.745	0.088
Accepting emotional support	3.91 (2.01)	3.63 (1.86)	0.28 (-0.82 – 1.38)	0.666	0.507
Behavioural disengagement	1.03 (1.36)	0.44 (0.92)	0.59 (-0.13 – 1.31)	2.207	0.032
Positive reframing	2.88 (1.68)	3.00 (1.85)	-0.12 (-1.16 – 0.91)	-0.318	0.751
Self distraction	3.41 (1.81)	2.61 (1.82)	0.80 (-0.25 – 1.85)	1.996	0.049
Venting	2.34 (1.93)	1.15 (1.57)	1.19 (0.21 – 2.18)	3.182	0.002
Accepting instrumental support	3.63 (1.88)	2.64 (1.88)	0.99 (-0.11 – 2.07)	2.375	0.020
Acceptance	4.59 (1.62)	4.47 (1.65)	0.12 (-0.83 – 1.07)	0.330	0.742
Self blame	2.63 (1.83)	1.17 (1.62)	1.46 (0.48 – 2.44)	3.911	< 0.001
Religion	2.44 (2.61)	1.29 (2.09)	1.15 (-0.17 – 2.47)	2.288	0.025
Humour	2.47 (2.21)	2.37 (2.29)	0.10 (-1.21 – 1.40)	0.193	0.847
Planning	3.84 (1.53)	3.14 (1.93)	0.70 (-0.33 – 1.75)	1.796	0.076

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix C- 12. The full results of independent t-tests between anxious and not anxious MI patients at 4-8 weeks post-MI

At 4-8 weeks post-MI	17 anxious (SD)	74 not anxious (SD)	Anxious – not anxious (99% CI)	t	p
Causal attribution component 1: Stress	3.12 (0.63)	2.65 (0.81)	0.47 (-0.08 – 1.02)	2.241	0.028
Causal attribution component 2: Uncontrollable (external) causes	2.74 (0.77)	2.63 (0.68)	0.11 (-0.39 – 0.60)	0.550	0.584
Causal attribution component 3: Unhealthy lifestyles/behaviours	3.17 (0.65)	2.99 (0.79)	0.18 (-0.37 – 0.72)	0.853	0.396
Consequence component 1: Physical consequences	3.41 (0.44)	2.85 (0.65)	0.56 (0.21 – 0.92)	4.323	< 0.001
Consequence component 2: Emotional consequences	3.61 (0.50)	3.03 (0.67)	0.58 (0.18 – 0.97)	3.980	< 0.001
Timeline	3.36 (0.63)	2.99 (0.63)	0.37 (-0.07 – 0.82)	2.210	0.030
Control component 1: Active control	3.94 (0.47)	3.89 (0.53)	0.05 (-0.32 – 0.42)	0.376	0.708
Control component 2: Passive control	2.71 (0.68)	2.49 (0.54)	0.22 (-0.18 – 0.62)	1.429	0.157
Symptom perception	16.12 (7.75)	9.82 (6.37)	6.30 (1.59 – 10.99)	3.525	0.001
Future MI threat	3.35 (1.22)	2.84 (0.79)	0.51 (-0.37 – 1.40)	1.660	0.113
Perceived total support	64.06 (15.15)	70.01 (10.77)	-0.95 (-14.22 – 2.31)	-1.896	0.061
Special one's support	22.94 (7.02)	23.38 (4.50)	0.44 (-5.53 – 4.66)	-0.245	0.809
Family support	20.65 (6.68)	23.68 (5.33)	-3.03 (-7.94 – 1.88)	-1.746	0.095
Friends' support	20.47 (4.46)	22.96 (3.74)	-2.49 (-5.24 – 0.26)	-2.386	0.019
Active coping	3.59 (1.46)	3.89 (1.70)	-0.30 (-1.48 – 0.87)	-0.680	0.498
Denial	2.41 (2.29)	1.70 (2.10)	0.71 (-0.80 – 2.22)	1.235	0.220
Substance abuse	0.82 (1.63)	0.31 (1.07)	0.51 (-0.67 – 1.70)	1.237	0.231
Accepting emotional support	3.71 (2.05)	3.73 (1.88)	-0.02 (-1.38 – 1.33)	-0.046	0.963
Behavioural disengagement	0.94 (1.14)	0.58 (1.11)	0.36 (-0.43 – 1.15)	1.199	0.234
Positive reframing	2.59 (1.84)	3.04 (1.77)	-0.45 (-1.72 – 0.81)	-0.943	0.348
Self distraction	2.76 (1.89)	2.92 (1.85)	-0.16 (-1.47 – 1.16)	-0.309	0.758
Venting	2.29 (1.99)	1.41 (1.71)	0.88 (-0.36 – 2.14)	1.872	0.065
Accepting instrumental support	3.12 (2.15)	2.96 (1.89)	0.16 (-1.22 – 1.53)	0.303	0.762
Acceptance	3.94 (1.64)	4.65 (1.62)	-0. 71(-1.86 – 0.44)	-1.623	0.108
Self blame	2.29 (2.02)	1.54 (1.76)	0.75 (-0.53 – 2.04)	1.547	0.125
Religion	1.41 (1.87)	1.76 (2.44)	-0.35 (-2.01 – 1.32)	-0.546	0.587
Humour	2.53 (2.13)	2.38 (2.29)	0.15 (-1.45 – 1.75)	0.248	0.805
Planning	4.18 (1.43)	3.20 (1.86)	0.98 (-0.29 – 2.24)	2.025	0.046

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix C- 13. The full results of independent t-tests between depressed and not depressed MI patients at 6-month post-MI

At 6-month post-MI	33 depressed (SD)	58 not depressed (SD)	Depressed – not depressed (99% CI)	t	p
Causal attribution component 1: Stress	2.89 (0.68)	2.46 (0.71)	0.43 (0.03 – 0.83)	2.802	0.006
Causal attribution component 2: Uncontrollable (external) causes	2.77 (0.70)	2.60 (0.65)	0.17 (-0.21 – 0.56)	1.193	0.236
Causal attribution component 3: Unhealthy lifestyles/behaviours	3.16 (0.80)	3.06 (0.76)	0.10 (-0.35 – 0.53)	0.539	0.591
Consequence component 1: Physical consequences	3.38 (0.60)	2.79 (0.64)	0.59 (0.23 – 0.95)	4.303	< 0.001
Consequence component 2: Emotional consequences	3.57 (0.59)	2.84 (0.65)	0.73 (0.37 – 1.09)	5.297	< 0.001
Timeline	3.48 (0.69)	3.19 (0.74)	0.29 (-0.12 – 0.71)	1.862	0.066
Control component 1: Active control	3.73 (0.57)	3.84 (0.50)	-0.11 (-0.41 – 0.19)	-0.957	0.341
Control component 2: Passive control	2.68 (0.58)	2.40 (0.57)	0.28 (-0.05 – 0.62)	2.271	0.026
Symptom perception	14.48 (6.23)	9.55 (6.45)	4.93 (1.28 – 8.59)	3.552	0.001
Future MI threat	3.21 (0.86)	2.84 (0.88)	0.37 (-0.13 – 0.87)	1.940	0.056
Perceived total support	61.79 (18.44)	68.17 (10.95)	-6.38 (-15.84 – 3.07)	-1.815	0.076
Special one's support	21.15 (7.64)	23.64 (4.36)	-2.49 (-6.38 – 1.41)	-1.717	0.093
Family support	21.00 (6.79)	22.64 (5.43)	-1.64 (-5.06 – 1.78)	-1.262	0.210
Friends' support	19.64 (6.32)	21.90 (3.87)	-2.26 (-5.52 – 1.00)	-1.866	0.068
Active coping	4.00 (1.37)	4.09 (1.70)	-0.09 (-0.95 – 0.78)	-0.264	0.792
Denial	2.18 (2.24)	1.03 (1.46)	1.15 (-0.02 – 2.31)	2.637	0.011
Substance abuse	0.85 (1.64)	0.41 (0.92)	0.44 (-0.40 – 1.27)	1.401	0.168
Accepting emotional support	3.27 (2.02)	3.10 (1.92)	1.17 (-0.95 – 1.29)	0.392	0.697
Behavioural disengagement	0.91 (1.38)	0.40 (0.92)	0.51 (-0.21 – 1.23)	1.910	0.062
Positive reframing	3.18 (1.81)	2.60 (1.83)	0.58 (-0.47 – 1.62)	1.457	0.149
Self distraction	3.33 (1.78)	2.71 (1.77)	0.62 (-0.39 – 1.64)	1.622	0.108
Venting	1.88 (1.95)	0.93 (1.23)	0.95 (-0.06 – 1.96)	2.524	0.015
Accepting instrumental support	2.91 (1.83)	2.40 (1.69)	0.51 (-0.49 – 1.51)	1.353	0.179
Acceptance	4.42 (1.50)	4.50 (1.61)	-0.08 (-0.98 – 0.83)	-0.221	0.826
Self blame	2.27 (2.30)	1.03 (1.62)	1.24 (0.03 – 2.45)	2.735	0.009
Religion	2.00 (2.40)	1.09 (1.98)	0.91 (-0.40 – 2.22)	1.859	0.068
Humour	2.30 (2.51)	1.90 (1.89)	0.40 (-0.93 – 1.75)	0.810	0.422
Planning	4.18 (1.78)	3.03 (2.05)	1.15 (0.06 – 2.23)	2.689	0.009

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix C- 14. The full results of independent t-tests between anxious and not anxious MI patients at 6-month post-MI

At 6-month post-MI	20 anxious (SD)	71 not anxious (SD)	Anxious – not anxious (99% CI)	t	p
Causal attribution component 1: Stress	2.92 (0.66)	2.53 (0.73)	0.38 (-0.09 – 0.86)	2.130	0.036
Causal attribution component 2: Uncontrollable (external) causes	2.69 (0.60)	2.65 (0.69)	0.04 (-0.42 – 0.48)	0.191	0.849
Causal attribution component 3: Unhealthy lifestyles/behaviours	3.39 (0.90)	3.01 (0.71)	0.38 (-0.12 – 0.88)	1.985	0.050
Consequence component 1: Physical consequences	3.41 (0.61)	2.89 (0.67)	0.52 (0.08 – 0.96)	3.138	0.002
Consequence component 2: Emotional consequences	3.62 (0.52)	2.96 (0.70)	0.66 (0.21 – 1.10)	3.905	<0.001
Timeline	3.66 (0.69)	3.19 (0.71)	0.47 (0.00 – 0.94)	2.631	0.010
Control component 1: Active control	3.74 (0.41)	3.82 (0.56)	-0.08 (-0.44 – 0.27)	-0.646	0.520
Control component 2: Passive control	2.50 (0.61)	2.50 (0.59)	0.0 (-0.39 – 0.39)	0.000	1.000
Symptom perception	15.70 (5.97)	10.11(6.50)	5.59 (1.33 – 9.85)	3.453	0.001
Future MI threat	3.45 (0.95)	2.85 (0.82)	0.60 (0.04 – 1.17)	2.813	0.006
Perceived total support	62.75 (15.69)	66.73 (13.96)	-3.98 (-13.54 – 5.58)	-1.096	0.276
Special one's support	21.40 (6.52)	23.11 (5.64)	-1.71 (-5.60 – 2.18)	-1.159	0.250
Family support	21.05 (5.72)	22.32 (6.05)	-1.27 (-5.26 – 2.71)	-0.841	0.403
Friends' support	20.30 (5.97)	21.30 (4.70)	-1.00 (-4.32 – 2.33)	-0.787	0.433
Active coping	4.05 (1.28)	4.06 (1.66)	-0.01 (-1.07 – 1.05)	-0.016	0.987
Denial	2.05 (2.16)	1.28 (1.74)	0.77 (-0.46 – 1.99)	1.649	0.103
Substance abuse	1.20 (1.85)	0.39 (0.95)	0.81 (0.01 – 1.61)	2.652	0.009
Accepting emotional support	3.05 (1.96)	3.20 (1.95)	-0.15 (-1.45 – 1.16)	-0.297	0.767
Behavioural disengagement	1.05 (1.57)	0.45 (0.94)	0.60 (-0.14 – 1.34)	2.144	0.035
Positive reframing	3.05 (1.54)	2.75 (1.91)	0.30 (-0.92 – 1.53)	0.653	0.516
Self distraction	3.00 (1.65)	2.92 (1.83)	0.08 (-1.11 – 1.28)	0.186	0.853
Venting	2.05 (1.85)	1.06 (1.44)	0.99 (-0.03 – 2.02)	2.551	0.012
Accepting instrumental support	2.65 (1.66)	2.56 (1.78)	0.09 (-1.08 – 1.26)	0.195	0.846
Acceptance	4.35 (1.46)	4.51 (1.60)	-0.16 (-1.21 – 0.89)	-0.394	0.694
Self blame	2.15 (2.13)	1.30 (1.90)	0.85 (-0.45 – 2.16)	1.728	0.087
Religion	1.70 (2.08)	1.34 (2.20)	0.36 (-1.09 – 1.81)	0.657	0.513
Humour	2.55 (2.35)	1.90 (2.06)	0.65 (-0.77 – 2.06)	1.207	0.231
Planning	4.00 (1.84)	3.30 (2.06)	0.70 (-0.64 – 2.05)	1.382	0.171

** $p \leq 0.01$; *** $p \leq 0.001$

APPENDIX D – CHARACTERISTICS OF 42 FIRST-TIME MI COUPLES DURING PATIENTS' HOSPITALISATION

Appendix D- 1. Alternative way of testing gender vs. couple effects for the 42 MI couples

	Step 1: independent t-tests (N = 84)	Step 2: simple ANOVA group effect (N = 84)	Step 3: ANOVA (controlling gender) group effect (N = 84)
Depression	Male: 14.55 (8.11) Female: 24.62 (13.16) t (M –F) = -4.223, p < 0.001	Patients: 14.76 (9.03) Spouses: 24.40 (12.72) $F_{(1, 82)}$ = 16.057, p < 0.001	Sex: $F_{(1, 81)}$ = 3.690, p = 0.058 Group: $F_{(1, 81)}$ = 2.183, p = 0.143
State anxiety	Male: 10.24 (3.46) Female: 14.31 (5.34) t (M –F) = -4.144, p < 0.001	Patients: 33.25 (11.32) Spouses: 48.57 (17.22) $F_{(1, 82)}$ = 23.201, p < 0.001	Sex: $F_{(1, 81)}$ = 1.404, p = 0.240 Group: $F_{(1, 81)}$ = 6.416, p = 0.013
Negative affect	Male: 20.48 (9.13) Female: 27.02 (8.92) t (M –F) = -3.326, p = 0.001	Patients: 19.64 (9.01) Spouses: 27.86 (8.31) $F_{(1, 82)}$ = 18.866, p < 0.001	Sex: $F_{(1, 81)}$ = 0.262, p = 0.610 Group: $F_{(1, 81)}$ = 7.079, p = 0.009 (partial η^2 = 0.080)

Appendix D- 2. The 42 MI couples' moods during patients' hospitalisation

	Patients			Spouses		
	42 patients	36 males	6 females	42 spouses	36 females	6 males
Depression	14.76 (9.03)	14.14 (8.27)	18.56 (13.04)	24.40 (12.72)	25.64 (13.08)	17.00 (7.24)
State anxiety	33.25 (11.32)	32.22 (10.01)	39.44 (17.18)	48.57 (17.22)	49.07 (17.77)	45.55 (14.40)
Positive affect	27.60 (7.40)	28.19 (7.49)	24.00 (6.23)	29.33 (7.53)	29.08 (8.06)	30.83 (2.64)
Negative	19.64 (9.01)	19.83 (9.39)	18.50 (6.83)	27.86 (8.31)	28.44 (8.48)	24.33 (6.74)

Appendix D- 3. Results of two-way ANOVA on gender vs. couple's role effects for the 42 MI couples

	Role (patients vs. spouses)	Gender (males vs. females)	Role x gender
Depression	$F_{(1, 80)}$ = 2.167, p = 0.145	$F_{(1, 80)}$ = 3.663, p = 0.059	$F_{(1, 80)}$ = 0.397, p = 0.531
State anxiety	$F_{(1, 80)}$ = 6.350, p = 0.014	$F_{(1, 80)}$ = 1.389, p = 0.242	$F_{(1, 80)}$ = 0.165, p = 0.686
Positive affect	$F_{(1, 80)}$ = 2.749, p = 0.101	$F_{(1, 80)}$ = 1.629, p = 0.206	$F_{(1, 80)}$ = 0.275, p = 0.601
Negative affect	$F_{(1, 80)}$ = 7.079, p = 0.009**	$F_{(1, 80)}$ = 0.262, p = 0.610	$F_{(1, 80)}$ = 1.006, p = 0.319

Appendix D- 4. Correlations between the 42 couples' demographic data and moods

	Patients' age	Patients' education	Days between admission & assessment 1	Spouses' age	Spouses' education
Patients' Depression	0.218 (p = 0.165)	0.416** (p = 0.006) d = 0.91	0.453** (p = 0.003)	0.138 (p = 0.384)	0.233 (p = 0.138)
Patients' State anxiety	0.095 (p = 0.548)	0.313 (p = 0.043)	0.288 (p = 0.064)	0.031 (p = 0.846)	0.127 (p = 0.425)
Patients' Positive affect	-0.380 (p = 0.013)	-0.018 (p = 0.909)	-0.284 (p = 0.068)	-0.401** (p = 0.008) d = 0.88	0.194 (p = 0.217)
Patients' Negative affect	-0.006 (p = 0.970)	0.327 (p = 0.035)	0.088 (p = 0.580)	-0.075 (p = 0.639)	0.088 (p = 0.579)
Spouses' Depression	-0.349 (p = 0.024)	0.196 (p = 0.213)	0.038 (p = 0.812)	-0.414** (p = 0.006) d = 0.91	0.172 (p = 0.172)
Spouses' State anxiety	-0.254 (p = 0.104)	0.141 (p = 0.373)	0.133 (p = 0.403)	-0.289 (p = 0.063)	0.236 (p = 0.132)
Spouses' Positive affect	0.062 (p = 0.696)	-0.075 (p = 0.636)	-0.084 (p = 0.599)	0.123 (p = 0.439)	0.076 (p = 0.633)
Spouses Negative affect	-0.425** (p = 0.005) d = 0.94	0.178 (p = 0.259)	-0.075 (p = 0.638)	-0.466** (p = 0.002) d = 1.05	0.141 (p = 0.374)
DIF-depression	0.412** (p = 0.007) d = 0.90	0.081 (p = 0.611)	0.232 (p = 0.139)	0.419** (p = 0.006) d = 0.92	-0.006 (p = 0.971)
DIF-anxiety	0.247 (p = 0.114)	0.050 (p = 0.751)	0.044 (p = 0.781)	0.241 (p = 0.124)	-0.102 (p = 0.451)
DIF-positive	-0.349 (p = 0.023)	0.046 (p = 0.773)	-0.157 (p = 0.320)	-0.415** (p = 0.006) d = 0.91	0.092 (p = 0.561)
DIF-negative	0.292 (p = 0.060)	0.123 (p = 0.439)	0.119 (p = 0.453)	0.270 (p = 0.084)	-0.032 (p = 0.843)

** $p \leq 0.01$

Appendix D- 5. Correlations between the 42 couples' own moods

Patients' mood	Depression	State anxiety	Positive affect
Depression			
State anxiety	0.650 p < 0.001		
Positive affect	-0.291 p = 0.062	-0.108 p = 0.496	
Negative affect	0.580 p < 0.001	0.610 p < 0.001	0.108 p = 0.495

Spouses' mood	Depression	State anxiety	Positive affect
Depression			
State anxiety	0.692 p < 0.001		
Positive affect	-0.241 p = 0.124	-0.394 p = 0.010	
Negative affect	0.784 p < 0.001	0.638 p < 0.001	-0.187 p = 0.235

** $p \leq 0.01$

Appendix D- 6. Correlations between the 42 couples' moods

Spouse	Patient: Depression	Patient: State anxiety	Patient: Positive affect	Patient: Negative affect
Depression	**0.008** **p = 0.958**	-0.125 p = 0.432	0.346 p = 0.025, d = 0.74	0.052 p = 0.743
State anxiety	0.135 p = 0.393	**-0.162** **p = 0.306**	0.182 p = 0.248	0.017 p = 0.915
Positive affect	0.050 p = 0.753	0.074 p = 0.642	**0.210** **p = 0.182**	0.307 p = 0.048, d = 0.65
Negative affect	-0.051 p = 0.751	-0.237 p = 0.131	0.302 p = 0.052, d = 0.63	**0.059** **p = 0.711**

Appendix D- 7. Comparisons of the 42 couples' individual causal attributions

	Patients Mean (SD)	Spouses Mean (SD)	Patients – spouses (99% CI)	t	p
1. Stress or worry	3.64 (1.10)	3.79 (1.32)	-0.143 (-0.676 – 0.391)	-0.723	0.474
2. Eating fatty foods	3.00 (1.27)	2.98 (1.32)	0.024 (-0.484 – 0.532)	0.127	0.900
3. The type of work you do or did	2.93 (1.35)	3.19 (1.35)	-0.262 (-0.815 – 0.291)	-1.280	0.208
4. High levels of cholesterol	3.17 (0.91)	3.17 (0.96)	0.000 (-0.422 – 0.422)	0.000	1.000
5. Heredity-runs in your family	2.64 (1.39)	3.05 (1.19)	-0.405 (-0.965 – 0.156)	-1.951	0.058
6. Smoking	3.19 (1.52)	3.07 (1.58)	0.119 (-0.419 – 0.657)	0.597	0.554
7. Being overweight	2.57 (1.11)	2.71 (1.18)	-0.143 (-0.590 – 0.304)	-0.863	0.393
8. Just bad luck or chance	3.10 (1.12)	3.24 (1.19)	-0.143 (-0.729 – 0.444)	-0.658	0.514
9. Fate	2.60 (1.08)	2.83 (1.32)	-0.238 (-0.812 – 0.335)	-1.121	0.269
10. High blood pressure	2.81 (1.22)	3.14 (1.16)	-0.333 (-0.781 – 0.115)	-2.011	0.051
11. Poor diet	2.43 (1.19)	2.48 (1.23)	-0.048 (-0.622 – 0.527)	-0.224	0.824
12. Pollution in the environment	2.95 (1.01)	2.83 (1.12)	0.119 (-0.520 – 0.758)	0.503	0.618
13. Arguing with people	2.26 (0.91)	2.33 (1.20)	-0.071 (-0.619 – 0.476)	-0.352	0.726
14. Over exertion or sudden exercise	2.55 (1.11)	2.55 (1.15)	0.000 (-0.451 – 0.451)	0.000	1.000
15. Lack of exercise	2.60 (1.23)	3.26 (1.25)	-0.667 (-1.315 - -0.018) d = 0.54	**-2.776**	**0.008**
16. Depression	2.12 (0.99)	2.36 (1.17)	-0.238 (-0.765 – 0.289)	-1.220	0.230
17. Drinking too much alcohol	1.95 (0.85)	1.95 (1.06)	0.000 (0.451 – 0.000)	0.000	1.000
18. The way other people treated you	2.05 (1.04)	2.12 (1.02)	-0.071 (-0.611 – 0.468)	-0.357	0.723
19. Listening to other people's problems	2.43 (1.06)	2.45 (1.21)	-0.024 (-0.617 – 0.569)	-0.108	0.914
20. A germ or virus	2.29 (0.84)	2.00 (0.91)	0.286 (-0.168 – 0.739)	1.701	0.096
21. Your mental attitude	2.26 (0.83)	2.38 (1.23)	-0.119 (-0.710 – 0.472)	-0.544	0.589
22. Poor medical care in the past	2.00 (0.88)	2.36 (1.23)	-0.357 (-0.900 – 0.186)	-1.776	0.083
23. Family problems or worries	2.62 (1.17)	2.79 (1.39)	-0.167 (-0.703 – 0.369)	-0.840	0.406
24. Overwork	2.71 (1.26)	2.76 (1.36)	-0.048 (-0.644 – 0.549)	-0.216	0.830
Causal component 1: stress	2.56 (0.66)	2.67 (0.73)	-0.112 (-0.416 – 0.187)	-1.023	0.312
Causal component 2: external/uncontrollable causes	2.73 (0.71)	2.73 (0.66)	0.006 (-0.304 – 0.316)	0.052	0.959
Causal component 3: unhealthy lifestyles	2.71 (0.65)	2.85 (0.73)	-0.131 (-0.413 – 0.151)	-1.255	0.217

Appendix D- 8. Comparisons of the 42 MI couples' symptom perception by multi-response coding (MR)

Symptom	Patients Mean (SD)	Spouses Mean (SD)	Patients – spouses (99% CI)	t	p
Fatigue	1.38 (1.01)	1.60 (1.06)	-0.214 (-0.706 – 0.277)	-1.177	0.246
Nausea	0.50 (0.80)	0.43 (0.63	0.071 (-0.312 – 0.455)	0.503	0.618
Breathlessness	0.74 (0.79)	0.79 (0.81)	-0.048 (-0.479 – 0.384)	-0.298	0.767
Chest pain	0.40 (0.59)	0.50 (0.55)	-0.095 (-0.384 – 0.193)	-0.892	0.377
Tightness in the chest/arm	0.40 (0.54)	0.57 (0.63)	-0.167 (-0.484 – 0.151)	-1.417	0.164
Upset stomach	0.36 (0.69)	0.38 (0.73)	-0.024 (-0.398 – 0.350)	-0.172	0.864
Sore eyes	0.26 (0.59)	0.24 (0.58)	0.024 (-0.260 – 0.307)	0.227	0.822
Sleep difficulties	0.55 (0.94)	1.07 (1.22)	-0.524 (-0.995 - -0.052)	**-3.001** d = 0.48	**0.005**
Dizziness	0.52 (0.74)	0.50 (0.74)	0.024 (-0.244 – 0.292)	0.240	0.812
Difficulty concentrating	0.36 (0.49)	0.60 (0.86)	-0.238 (-0.568 – 0.091)	-1.952	0.058
Irritability	0.31 (0.56)	0.50 (0.71)	-0.190 (-0.513 – 0.132)	-1.598	0.118
Stiff or sore joints	0.31 (0.68)	0.60 (0.91)	-0.286 (-0.700 – 0.129)	-1.861	0.070
Headache	0.38 (0.54)	0.40 (0.63)	-0.024 (-0.239 – 0.192)	-0.298	0.767
Loss of strength	0.74 (0.91)	0.81 (0.94)	-0.071 (-0.535 – 0.392)	-0.416	0.680
Dry mouth	0.71 (0.89)	0.74 (0.96)	-0.024 (-0.409 – 0.361)	-0.167	0.868
Total symptom score	7.93 (6.24)	9.71 (7.08)	-1.786 (-4.281 – 0.709)	-1.933	0.060

** $p \leq 0.01$

Appendix D- 9. Comparisons of the 42 MI couples' symptom perception by dichotomous coding (DI)

Symptom	Patients Mean (SD)	Spouses Mean (SD)	Patients – spouses (99% CI)	t	p
Fatigue	0.79 (0.42)	0.81 (0.40)	-0.024 (-0.285 – 0.211)	-0.274	0.785
Nausea	0.36 (0.49)	0.36 (0.49)	0.000 (-0.260 – 0.260)	0.000	1.000
Breathlessness	0.57 (0.50)	0.57 (0.50)	0.000 (-0.244 – 0.244)	0.000	1.000
Chest pain	0.36 (0.49)	0.48 (0.51)	-0.119 (-0.366 – 0.128)	-1.302	0.200
Tightness in the chest/arm	0.38 (0.49)	0.50 (0.51)	-0.119 (-0.413 – 0.175)	-1.094	0.281
Upset stomach	0.26 (0.45)	0.26 (0.45)	0.000 (-0.206 – 0.206)	0.000	1.000
Sore eyes	0.19 (0.40)	0.19 (0.40)	0.000 (-0.225 – 0.225)	0.000	1.000
Sleep difficulties	0.31 (0.47)	0.52 (0.51)	-0.214 (-0.431 – 0.002)	-2.672	0.011
Dizziness	0.38 (0.49)	0.36 (0.50)	0.024 (-0.192 – 0.239)	0.298	0.767
Difficulty concentrating	0.36 (0.49)	0.40(0.50)	-0.048 (-0.272 – 0.177)	-0.573	0.570
Irritability	0.26 (0.45)	0.38 (0.49)	-0.119 (-0.348 – 0.110)	-1.403	0.168
Stiff or sore joints	0.21 (0.42)	0.38 (0.49)	-0.167 (-0.391 – 0.057)	-2.011	0.051
Headache	0.36 (0.49)	0.33 (0.48)	0.024 (-0.171 – 0.219)	0.330	0.743
Loss of strength	0.50 (0.51)	0.50 (0.51)	0.000 (-0.260 – 0.260)	0.000	1.000
Dry mouth	0.48 (0.51)	0.45 (0.50)	0.024 (-0.211 – 0.258)	0.274	0.785
Total symptom score	5.76 (4.00)	6.50 (3.80)	-0.738 (-2.234 – 0.758)	-1.333	0.190

** $p \leq 0.01$

Appendix D- 10. Comparisons of illness consequences, timeline, control/cure and future MI threat between the 42 couples

	Patients (SD)	Spouses (SD)	Patients – spouses (99% CI)	t	p
Consequence component 1: Physical consequences	2.82 (0.62)	2.94 (0.75)	-0.116 (-0.428 – 0.197)	-0.999 (paired t)	0.324
Consequence component 2: Emotional consequences	3.23 (0.65)	3.63 (0.78)	-0.405 (-0.817 – 0.007) -0.397 (-0.753 - -0.041)	-2.591 (independent t) -3.009 (paired t)	0.011 0.004
Timeline	2.94 (0.73)	2.93 (0.73)	0.000 (-0.373 – 0.373)	0.000 (paired t)	1.000
Control component 1: Active control	3.93 (0.47)	4.01 (0.69)	-0.077 (-0.343 – 0.189)	-0.786 (paired t)	0.436
Control component 2: Passive control	2.76 (1.17)	2.64 (0.58)	0.125 (-0.422 – 0.672)	0.617 (paired t)	0.541
Future MI threat	2.67 (0.95)	3.02 (0.90)	-0.357 (-0.868 – 0.154)	-1.888 (paired t)	0.066

** $p \leq 0.01$

Appendix D- 11. Correlations between the 42 couples' illness perceptions and demographic data

	Patients' age	Patients' education	Days between admission & assessment 1	Spouses' age	Spouses' education
Patients					
Cause component 1: stress	-0.184 (p = 0.243)	0.228 (p = 0.146)	0.053 (p = 0.739)	-0.234 (p = 0.135)	-0.036 (p = 0.823)
Cause component 2: uncontrollable	0.231 (p = 0.141)	-0.012 (p = 0.940)	0.179 (p = 0.258)	0.216 (p = 0.169)	0.025 (p = 0.874)
Cause component 3: unhealthy lifestyles	-0.198 (p = 0.210)	-0.174 (p = 0.271)	-0.188 (p = 0.232)	-0.251 (p = 0.108)	-0.271 (p = 0.083)
Consequence component 1: Physical consequences	0.039 (p = 0.805)	0.378 (p = 0.014)	0.290 (p = 0.063)	-0.135 (p = 0.395)	0.320 (p = 0.039)
Consequence component 2: Emotional consequences	-0.117 (p = 0.459)	0.298 (p = 0.055)	0.185 (p = 0.241)	-0.182 (p = 0.248)	**0.400 (p = 0.009)**
Timeline	0.031 (p = 0.845)	0.108 (p = 0.495)	0.144 (p = 0.363)	0.013 (p = 0.934)	0.007 (p = 0.964)
Control component 1: Active control	-0.301 (p = 0.053)	-0.111 (p = 0.483)	**-0.432 (p = 0.004)**	-0.345 (p = 0.025)	0.011 (p = 0.946)
Control component 2: Passive control	0.228 (p = 0.146)	-0.030 (p = 0.852)	0.129 (p = 0.416)	0.169 (p = 0.285)	0.142 (p = 0.369)
Symptom perception	0.168 (p = 0.288)	0.163 (p = 0.302)	0.301 (p = 0.053)	0.105 (p = 0.507)	-0.096 (p = 0.544)
Future MI threat	0.046 (p = 0.774)	0.207 (p = 0.188)	0.177 (p = 0.263)	0.056 (p = 0.726)	-0.087 (p = 0.584)
Spouses					
Cause component 1: stress	**-0.507 (p = 0.001) (-0.745 - -0.143) d = 1.18**	0.236 (p = 0.132)	0.006 (p = 0.968)	**-0.496 (p = 0.001) (-0.745 - -0.13) d = 1.14**	0.270 (p = 0.084)
Cause component 2: uncontrollable	0.100 (p = 0.530)	0.020 (p = 0.900)	0.007 (p = 0.966)	0.036 (p = 0.820)	-0.143 (p = 0.368)
Cause component 3: unhealthy lifestyles	-0.357 (p = 0.020)	-0.104 (p = 0.512)	-0.079 (p = 0.619)	**-0.416 (p = 0.006) (-0.695 - -0.028) d = 0.91**	0.024 (p = 0.882)
Consequence component 1: Physical consequences	**-0.488 (p = 0.001) (-0.74 - -0.12) d = 1.12**	0.351 (p = 0.023)	0.091 (p = 0.566)	**-0.568 (p < 0.001) (-0.785 - -0.23) d = 1.38**	0.181 (p = 0.252)
Consequence component 2: Emotional consequences	**-0.413 (p = 0.007) (-0.69 - -0.023) d = 0.91**	0.255 (p = 0.103)	0.105 (p = 0.508)	**-0.439 (p = 0.004) (-0.71 - -0.059) d = 0.98**	0.171 (p = 0.278)
Timeline	-0.297 (p = 0.056)	0.003 (p = 0.984)	-0.013 (p = 0.935)	-0.334 (p = 0.031)	0.119 (p = 0.453)
Control component 1: Active control	-0.205 (p = 0.193)	-0.041 (p = 0.797)	-0.185 (p = 0.240)	-0.265 (p = 0.090)	-0.002 (p = 0.989)
Control component 2: Passive control	0.122 (p = 0.443)	-0.016 (p = 0.921)	0.063 (p = 0.692)	0.101 (p = 0.523)	-0.167 (p = 0.291)
Symptom perception	-0.198 (p = 0.209)	0.198 (p = 0.209)	0.162 (p = 0.305)	-0.286 (p = 0.066)	-0.004 (p = 0.978)
Future MI threat	0.123 (p = 0.438)	-0.002 (p = 0.989)	0.146 (p = 0.355)	0.082 (p = 0.606)	0.177 (p = 0.262)
Differences between couples					
Cause component 1: stress	0.342 (p = 0.026)	-0.029 (p = 0.857)	0.042 (p = 0.790)	0.284 (p = 0.068)	-0.304 (p = 0.050)
Cause component 2: uncontrollable	0.130 (p = 0.411)	-0.029 (p = 0.855)	0.163 (p = 0.301)	0.173 (p = 0.274)	0.151 (p = 0.340)
Cause 3: lifestyle	0.079 (p = 0.619)	0.054 (p = 0.732)	-0.089 (p = 0.575)	0.091 (p = 0.568)	-0.175 (p = 0.269)
Physical consequences	**0.520 (p < 0.001) (0.745 – 0.16) d = 1.22**	-0.036 (p = 0.820)	0.150 (p = 0.344)	**0.456 (p = 0.002) (0.715 – 0.078) d = 1.02**	0.085 (p = 0.591)
Emotional consequences	0.291 (p = 0.062)	-0.009 (p = 0.954)	0.043 (p = 0.785)	0.265 (p = 0.090)	0.145 (p = 0.360)
Time-line	0.266 (p = 0.088)	0.086 (p = 0.589)	0.128 (p = 0.419)	0.282 (p = 0.071)	-0.091 (p = 0.568)
Active control	0.004 (p = 0.982)	-0.037 (p = 0.818)	-0.113 (p = 0.475)	0.036 (p = 0.819)	0.010 (p = 0.949)
Passive control	0.149 (p = 0.345)	-0.019 (p = 0.903)	0.087 (p = 0.584)	0.106 (p = 0.505)	0.200 (p = 0.203)
Perceived symptoms	-0.054 (p = 0.732)	0.163 (p = 0.303)	0.030 (p = 0.849)	-0.017 (p = 0.917)	-0.197 (p = 0.211)
Future cardiac threat	**0.409 (p = 0.007) (0.69 – 0.02) d = 0.90**	-0.064 (p = 0.688)	0.122 (p = 0.442)	**0.448 (p = 0.003) (0.725 – 0.084) d = 1.00**	-0.095 (p = 0.549)

** $p \leq 0.01$

Appendix D- 12. Correlations between the 42 patients' illness perceptions

Patients' illness perceptions	Stress	External	lifestyles	Physical	Emotional	Timeline	Active control	Passive control	Threat
Stress causes									
Uncontrollable /external cause	0.133 (p = 0.399)								
Unhealthy lifestyles	**0.488 (p = 0.001) d = 1.12**	-0.016 (p = 0.917)							
Physical consequences	0.010 (p = 0.948)	-0.013 (p = 0.933)	0.121 (p = 0.445)						
Emotional consequences	0.015 (p = 0.927)	-0.267 (p = 0.087)	0.114 (p = 0.474)	**0.598 (p < 0.001) d = 1.49**					
Timeline	-0.144 (p = 0.362)	-0.305 (p = 0.050)	-0.082 (p = 0.604)	0.231 (p = 0.142)	0.244 (p = 0.120)				
Active control	0.117 (p = 0.461)	-0.031 (p = 0.843)	**0.441 (p = 0.003) d = 0.98**	-0.102 (p = 0.521)	0.094 (p = 0.553)	-0.174 (p = 0.272)			
Passive control	-0.174 (p = 0.272)	-0.281 (p = 0.072)	0.071 (p = 0.654)	0.297 (p = 0.056)	0.168 (p = 0.286)	-0.001 (p = 0.997)	0.055 (p = 0.731)		
Threat	-0.027 (p = 0.866)	0.000 (p = 1.000)	0-.030 (p = 0.853)	0.102 (p = 0.522)	0.099 (p = 0.534)	**0.557 (p < 0.001) d = 1.34**	-0.256 (p = 0.101)	0.009 (p = 0.954)	
Symptom perception	0.178 (p = 0.259)	-0.136 (p = 0.390)	0.147 (p = 0.353)	0.198 (p = 0.208)	0.229 (p = 0.145)	-0.003 (p = 0.984)	-0.281 (p = 0.071)	0.070 (p = 0.662)	0.045 (p = 0.777)

** $p \leq 0.01$

Appendix D- 13. Correlations between the 42 spouses' illness perceptions

Spouses' illness perceptions	Stress	External	lifestyles	Physical	Emotional	Timeline	Active control	Passive control	Threat
Stress causes									
Uncontrollable /external cause	0.126 (p = 0.426)								
Unhealthy lifestyles	**0.449 (p = 0.003) d = 1.0**	-0.084 (p = 0.599)							
Physical consequences	**0.606 (p < 0.001) d = 1.52**	0.120 (p = 0.450)	0.358 (p = 0.020)						
Emotional consequences	**0.577 (p < 0.001) d = 1.41**	0.139 (p = 0.381)	0.314 (p = 0.043)	**0.602 (p < 0.001) d = 1.51**					
Timeline	0.192 (p = 0.224)	**-0.477 (p = 0.001) d = 1.07**	0.383 (p = 0.012)	**0.481 (p = 0.001) d = 1.10**	0.135 (p = 0.395)				
Active control	0.191 (p = 0.226)	0.150 (p = 0.343)	0.317 (p = 0.041)	0.085 (p = 0.591)	0.057 (p = 0.720)	-0.182 (p = 0.248)			
Passive control	-0.031 (p = 0.846)	**0.402 (p = 0.008) d = 0.88**	-0.122 (p = 0.442)	0.045 (p = 0.777)	-0.020 (p = 0.900)	**-0.417 (p = 0.006) d = 0.92**	0.182 (p = 0.250)		
Threat	0.102 (p = 0.522)	-0.112 (p = 0.480)	0.295 (p = 0.058)	-0.117 (p = 0.461)	-0.102 (p = 0.519)	0.085 (p = 0.594)	-0.049 (p = 0.756)	-0.089 (p = 0.577)	
Symptom perception	0.328 (p = 0.034)	-0.099 (p = 0.533)	0.355 (p = 0.021)	**0.528 (p < 0.001) d = 1.24**	**0.393 (p = 0.010) d = 0.85**	0.321 (p = 0.038)	0.125 (p = 0.431)	-0.093 (p = 0.559)	0.005 (p = 0.975)

** $p \leq 0.01$

Appendix D- 14. The full correlation table between the 42 MI couples' illness perceptions

		Patient									
		Stress	external	Lifestyles	Physical consequences	Emotional consequences	Timeline	Active control	Passive control	Cardiac threat	Symptoms
Spouse	Stress	**0.465 (p = 0.002) (0.73 – 0.09) d = 1.05**	-0.193 (p = 0.221)	0.163 (p = 0.303)	0.241 (p = 0.124)	0.138 (p = 0.383)	-0.009 (p = 0.955)	0.041 (p = 0.796)	-0.031 (p = 0.845)	0.000 (p = 1.000)	0.026 (p = 0.868)
	Uncontrollable (external)	0.154 (p = 0.330)	**0.410 (p = 0.007) (0.69 – 0.02) d = 0.90**	0.014 (p = 0.930)	0.067 (p = 0.671)	-0.205 (p = 0.192)	-0.129 (p = 0.415)	-0.015 (p = 0.925)	-0.073 (p = 0.648)	-0.042 (p = 0.793)	-0.117 (p = 0.460)
	Lifestyles	0.092 (p = 0.561)	-0.300 (p = 0.053)	**0.522 (p < 0.001) (0.75 – 0.16) d = 1.22**	0.304 (p = 0.050)	0.108 (p = 0.495)	0.022 (p = 0.892)	0.282 (p = 0.071)	0.148 (p = 0.350)	-0.164 (p = 0.301)	0.207 (p = 0.189)
	Physical consequences	0.311 (p = 0.045)	-0.050 (p = 0.753)	0.134 (p = 0.398)	**0.414 (p = 0.006) (0.69 – 0.02) d = 0.91**	0.176 (p = 0.265)	0.080 (p = 0.613)	-0.030 (p = 0.851)	-0.065 (p = 0.683)	-0.070 (p = 0.660)	0.258 (p = 0.099)
	Emotional consequences	**0.468 (p = 0.002) (0.72 – 0.09) d = 1.06**	-0.264 (p = 0.092)	0.264 (p = 0.092)	**0.417 (p = 0.006) (0.69 – 0.03) d = 0.92**	0.300 (p = 0.054)	0.008 (p = 0.960)	-0.125 (p = 0.431)	0.176 (p = 0.266)	-0.145 (p = 0.361)	0.189 (p = 0.232)
	Timeline	0.038 (p = 0.812)	-0.364 (p = 0.018)	0.145 (p = 0.360)	0.159 (p = 0.313)	0.283 (p = 0.069)	0.244 (p = 0.119)	0.085 (p = 0.592)	0.114 (p = 0.471)	-0.094 (p = 0.555)	0.172 (p = 0.275)
	Active control	0.013 (p = 0.935)	0.106 (p = 0.503)	0.323 (p = 0.037)	0.156 (p = 0.323)	0.046 (p = 0.773)	-0.116 (p = 0.463)	**0.451 (p = 0.003) (0.71 – 0.07) d = 1.01**	0.163 (p = 0.301)	0.015 (p = 0.923)	-0.027 (p = 0.867)
	Passive control	0.342 (p = 0.027)	**0.479 (p = 0.001) 0.73 – 0.11) d = 1.09**	0.297 (p = 0.056)	-0.077 (p = 0.627)	-0.106 (p = 0.503)	-0.299 (p = 0.054)	0.119 (p = 0.454)	-0.016 (p = 0.920)	-0.059 (p = 0.711)	0.004 (p = 0.978)
	Cardiac threat	0.084 (p = 0.599)	-0.105 (p = 0.507)	0.133 (p = 0.400)	0.226 (p = 0.150)	0.250 (p = 0.111)	0.330 (p = 0.033)	-0.025 (p = 0.873)	0.052 (p = 0.743)	**0.124 (p = 0.436)**	-0.008 (p = 0.958)
	Symptoms	0.264 (p = 0.092)	-0.028 (p = 0.861)	0.141 (p = 0.375)	0.340 (p = 0.027)	0.291 (p = 0.062)	0.005 (p = 0.975)	-0.124 (p = 0.433)	0.003 (p = 0.983)	0.004 (p = 0.982)	**0.602 (p < 0.001) (0.80 – 0.28) d = 1.51**

d = effect size

Appendix D- 15. Correlations between the 42 patients' moods and the 42 couples' illness perceptions

Patients' mood vs. different sources of perceptions	Depression	State anxiety	Positive affect	Negative affect
Patients' illness perceptions - Cause 1: stress	0.182 (p = 0.250)	0.031 (p = 0.846)	0.125 (p = 0.429)	0.074 (p = 0.643)
Cause 2: uncontrollable	-0.023 (p = 0.887)	-0.115 (p = 0.470)	-0.052 (p = 0.745)	-0.214 (p = 0.174)
Cause 3: lifestyles	-0.008 (p = 0.961)	-0.028 (p = 0.859)	0.027 (p = 0.866)	0.191 (p = 0.225)
Physical consequence	**0.557 (p < 0.001) (0.86 – 0.21) d = 1.37**	0.372 (p = 0.015)	0.058 (p = 0.716)	**0.558 (p < 0.001)(0.77 – 0.21) d = 1.34**
Emotional consequence	**0.401 (p = 0.008) (0.68 – 0.01) d = 0.88**	**0.413 (p = 0.007) (0.69 – 0.02) d = 0.91**	0.036 (p = 0.822)	**0.512 (p = 0.001) (0.75 – 0.15) d = 1.19**
Timeline	0.197 (p = 0.212)	**0.446 (p = 0.003) (0.71 – 0.02) d = 0.99**	-0.211 (p = 0.179)	0.195 (p = 0.217)
Active control	-0.307 (p = 0.048)	-0.298 (p = 0.055)	0.155 (p = 0.327)	-0.160 (p = 0.312)
Passive control	0.144 (p = 0.364)	0.065 (p = 0.684)	0.108 (p = 0.497)	0.100 (p = 0.528)
Future MI threat	0.126 (p = 0.425)	0.366 (p = 0.017)	-0.054 (p = 0.734)	0.156 (p = 0.324)
Symptom perception	**0.627 (p < 0.001) (0.31 – 0.81) d = 1.61**	**0.550 (p < 0.001) (0.77 – 0.20) d = 1.32**	-0.094 (p = 0.553)	**0.527 (p < 0.001) (0.76 – 0.17) d = 1.24**
Spouses' illness perceptions - Cause 1: stress	0.107 (p = 0.501)	0.033 (p = 0.835)	0.199 (p = 0.206)	0.088 (p = 0.580)
Cause 2: uncontrollable	-0.148 (p = 0.350)	-0.071 (p = 0.656)	0.007 (p = 0.966)	-0.227 (p = 0.147)
Cause 3: lifestyles	0.117 (p = 0.462)	0.078 (p = 0.621)	-0.059 (p = 0.709)	0.109 (p = 0.491)
Physical consequence	0.229 (p = 0.145)	0.194 (p = 0.218)	0.301 (p = 0.052)	0.241 (p = 0.124)
Emotional consequence	0.282 (p = 0.070)	0.085 (p = 0.593)	0.209 (p = 0.184)	0.311 (p = 0.045)
Timeline	0.037 (p = 0.815)	0.266 (p = 0.088)	0.256 (p = 0.101)	0.196 (p = 0.213)
Active control	-0.070 (p = 0.661)	-0.160 (p = 0.311)	0.024 (p = 0.882)	0.103 (p = 0.516)
Passive control	-0.098 (p = 0.535)	-0.200 (p = 0.205)	-0.140 (p = 0.376)	-0.267 (p = 0.087)
Future MI threat	0.191 (p = 0.227)	0.176 (p = 0.264)	-0.241 (p = 0.124)	0.010 (p = 0.949)
Symptom perception	**0.545 (p < 0.001) (0.77 – 0.19) d = 1.30**	0.367 (p = 0.017)	0.102 (p = 0.522)	0.314 (p = 0.043)
Differences between couples' cognition Cause 1: stress	0.059 (p = 0.710)	-0.005 (p = 0.974)	-0.086 (p = 0.589)	-0.021 (p = 0.895)
Cause 2: uncontrollable	0.110 (p = 0.488)	-0.046 (p = 0.773)	-0.055 (p = 0.730)	-0.001 (p = 0.997)
Cause 3: lifestyles	-0.133 (p = 0.401)	-0.112 (p = 0.482)	0.090 (p = 0.572)	0.065 (p = 0.684)
Physical consequence	0.235 (p = 0.135)	0.115 (p = 0.468)	-0.253 (p = 0.106)	0.223 (p = 0.156)
Emotional consequence	0.044 (p = 0.780)	0.235 (p = 0.135)	-0.165 (p = 0.297)	0.102 (p = 0.520)
Timeline	0.130 (p = 0.411)	0.148 (p = 0.351)	-0.380 (p = 0.013)	-0.001 (p = 0.997)
Active control	-0.148 (p = 0.349)	-0.043 (p = 0.786)	0.087 (p = 0.582)	-0.229 (p = 0.145)
Passive control	0.171 (p = 0.278)	0.146 (p = 0.357)	0.158 (p = 0.318)	0.207 (p = 0.188)
Future MI threat	-0.041 (p = 0.797)	0.156 (p = 0.324)	0.134 (p = 0.397)	0.114 (p = 0.472)
Symptom perception	0.008 (p = 0.959)	0.139 (p = 0.379)	-0.218 (p = 0.165)	0.178 9p = 0.260)

Appendix D- 16. Correlations between the 42 spouses' moods and the 42 couples' illness perceptions

Spouses' mood vs. different sources of perceptions	Depression	State anxiety	Positive affect	Negative affect
Patients' illness perceptions - Cause 1: stress	0.340 (p = 0.027)	0.311 (p = 0.045)	-0.121 (p = 0.444)	0.332 (p = 0.032)
Cause 2: uncontrollable	-0.066 (p = 0.676)	0.083 (p = 0.601)	-0.028 (p = 0.863)	-0.038 (p = 0.812)
Cause 3: lifestyles	0.157 (p = 0.319)	0.088 (p = 0.581)	-0.171 (p = 0.280)	0.279 (p = 0.073)
Physical consequence	0.327 (p = 0.035)	0.229 (p = 0.145)	0.019 (p = 0.905)	0.271 (p = 0.082)
Emotional consequence	0.192 (p = 0.224)	0.080 (p = 0.616)	0.088 (p = 0.577)	0.167 (p = 0.290)
Timeline	-0.089 (p = 0.575)	-0.286 (p = 0.066)	-0.103 (p = 0.518)	-0.266 (p = 0.089)
Active control	0.032 (p = 0.839)	-0.073 (p = 0.647)	0.005 (p = 0.977)	0.256 (p = 0.102)
Passive control	0.134 (p = 0.397)	-0.005 (p = 0.974)	-0.113 (p = 0.477)	0.211 (p = 0.180)
Future MI threat	-0.149 (p = 0.345)	-0.193 (p = 0.221)	-0.144 (p = 0.364)	-0.218 (p = 0.165)
Symptom perception	-0.088 (p = 0.579)	-0.130 (p = 0.413)	0.232 (p = 0.140)	-0.129 (p = 0.415)
Spouses' illness perceptions - Cause 1: stress	**0.468 (p = 0.002) (0.72 – 0.09) d = 1.06**	**0.453 (p = 0.003) (0.72 – 0.07) d = 1.02**	-0.118 (p = 0.456)	**0.449 (p = 0.003) (0.70 – 0.06) d = 1.00**
Cause 2: uncontrollable	0.254 (p = 0.105)	0.341 (p = 0.027)	**-0.401 (p = 0.009) (-0.70 - -0.01) d = 0.88**	0.307 (p = 0.048)
Cause 3: lifestyles	0.083 (p = 0.601)	0.100 (p = 0.528)	-0.168 (p = 0.287)	0.222 (p = 0.158)
Physical consequence	**0.569 (p < 0.001) (0.79 – 0.23) d = 1.38**	0.281 (p = 0.072)	0.022 (p = 0.891)	**0.392 (p = 0.010) (0.82 – 0.01) d = 0.85**
Emotional consequence	**0.771 (p < 0.001) (0.89 – 0.54) d = 2.42**	**0.582 (p < 0.001) (0.79 – 0.25) d = 1.43**	-0.116 (p = 0.465)	**0.716 (p < 0.001) (0.86 – 0.45) d = 2.05**
Timeline	0.035 (p = 0.826)	-0.236 (p = 0.132)	0.132 (p = 0.404)	-0.099 (p = 0.532)
Active control	0.044 (p = 0.780)	-0.019 9p = 0.905)	0.173 (p = 0.273)	0.381 (p = 0.013)
Passive control	0.213 (p = 0.175)	0.128 (p = 0.419)	-0.201 (p = 0.202)	0.181 (p = 0.250)
Future MI threat	-0.390 (p = 0.011)	-0.114 (p = 0.474)	-0.030 (p = 0.850)	-0.317 (p = 0.041)
Symptom perception	0.141 (p = 0.375)	0.020 (p = 0.900)	0.125 (p = 0.429)	0.134 (p = 0.396)
Differences between couples' cognition Cause 1: stress	-0.159 (p = 0.315)	-0.171 (p = 0.278)	0.008 (p = 0.962)	-0.148 (p = 0.351)
Cause 2: uncontrollable	-0.289 (p = 0.063)	-0.225 (p = 0.153)	0.331 9p = 0.032)	-0.309 (p = 0.046)
Cause 3: lifestyles	0.061 (p = 0.703)	-0.024 (p = 0.879)	0.018 (p = 0.908)	0.027 (p = 0.865)
Physical consequence	-0.297 (p = 0.056)	-0.090 (p = 0.569)	-0.006 (p = 0.970)	-0.166 (p = 0.294)
Timeline	-0.101 (p = 0.524)	-0.042 (p = 0.791)	-0.191 (p = 0.226)	-0.136 (p = 0.389)
Active control	-0.025 (p = 0.877)	-0.033 (p = 0.838)	-0.185 (p = 0.241)	-0.227 (p = 0.147)
Passive control	0.025 (p = 0.873)	-0.061 (p = 0.701)	-0.012 (p = 0.941)	0.108 (p = 0.497)
Future MI threat	0.169 (p = 0.285)	-0.067 (p = 0.673)	-0.090 (p = 0.572)	0.062 (p = 0.697)
Symptom perception	-0.258 (p = 0.099)	-0.159 (p = 0.316)	0.093 (p = 0.558)	-0.293 (p = 0.059)

Appendix D- 17. The significant comparison results of the 42 couples' mood at time 1 between three groups by using patient's score minus spouse's score

	Between Group Effect		Post Hoc		
	F value	p		Effect size & p	Mean score
Spouses' state mood					
Depression Emotional consequences	$F_{(2, 39)} = 5.930$	0.005	G3 – G1 = 12.90 (0.86 – 24.94)	p = 0.006, d =	G1 = 16.21 ± 11.56 (N = 14) G2 = 20.50 ± 17.68 (N = 2) G3 = 29.12 ± 11.02 (N = 26)
Negative affect Emotional consequences	$F_{(2, 39)} = 6.858$	0.003	G3 – G1 = 9.00 (1.84 – 16.16)	p = 0.001	G1 = 22.00 ± 6.30 (N = 14) G2 = 28.00 ± 5.66 (N = 2) G3 = 31.00 ± 7.87 (N = 26)

G1 = patient > spouse; G2 = patient = spouse; G3 = patient < spouse

APPENDIX E – 35 MI COUPLES' CHARACTERISTICS DURING THE FIRST SIX MONTHS POST-MI

Appendix E- 1. The full repeated measures ANOVA on the 35 MI couples' social support over the first six months

	Patient (M.SD)	Spouse (M, SD)	'Time effect' within patients	'Time effect' within spouses	Couples together (time, group, interaction, independent t-tests)
Social support					
Total support –					
Time 2	74.66 (7.70)	66.14 (12.10)	$F_{(1, 34)} = 6.904$, $p = 0.013$	$F_{(1, 34)} = 1.747$, $p = 0.195$	Time: $F_{(1, 68)} = 4.771$, $p = 0.032$
Time 3	71.63 (6.65)	62.40 (15.97)	(ES: partial $\eta^2 = 0.169$)		Group: $F_{(1, 68)} = 16.361$, $p < 0.001$ (ES: partial $\eta^2 = 0.194$)
					Interaction: $F_{(1, 68)} = 0.053$, $p = 0.818$
					t-tests: t2 = 3.513, p = 0.001; t3 = 3.155, p = 0.003
Special one's –					
Time 2	26.46 (1.98)	22.63 (5.63)	$F_{(1, 34)} = 3.792$, $p = 0.060$	$F_{(1, 34)} = 1.373$, $p = 0.249$	Time: $F_{(1, 68)} = 2.908$, $p = 0.093$
Time 3	25.77 (2.24)	21.43 (6.79)			Group: $F_{(1, 68)} = 17.896$, $p < 0.001$ (ES: partial $\eta^2 = 0.208$)
					Interaction: $F_{(1, 68)} = 0.216$, $p = 0.643$
					t-tests: t2 = 3.799, p < 0.001; t3 = 3.593, p = 0.001
Family's support					
Time 2	25.06 (4.43)	23.17 (4.31)	$F_{(1, 34)} = 1.631$, $p = 0.210$	$F_{(1, 34)} = 2.270$, $p = 0.141$	Time: $F_{(1, 68)} = 3.788$, $p = 0.056$
Time 3	24.23 (3.07)	21.51 (6.09)			Group: $F_{(1, 68)} = 6.584$, $p = 0.012$ (ES: partial $\eta^2 = 0.008$)
					Interaction: $F_{(1, 68)} = 0.421$, $p = 0.519$
					t-tests: t2 = 1.805, p = 0.076; t3 = 2.355, p = 0.022
Friend's support					
Time 2	23.14 (3.93)	20.34 (5.62)	$F_{(1, 34)} = 5.974$, $p = 0.020$	$F_{(1, 34)} = 0.695$, $p = 0.410$	Time: $F_{(1, 68)} = 3.611$, $p = 0.062$
Time 3	21.63 (3.25)	19.46 (6.21)			Group: $F_{(1, 68)} = 6.339$, $p = 0.014$
					Interaction: $F_{(1, 68)} = 0.248$, $p = 0.620$
					t-tests: t2 = 2.416, p = 0.019; t3 = 1.833, p = 0.073
Available support					
Time 2	7.69 (2.31)	6.45 (2.83)	$F_{(1, 34)} = 3.664$, $p = 0.064$	$F_{(1, 34)} = 0.001$, $p = 0.979$	Time: $F_{(1, 68)} = 1.805$, $p = 0.184$
Time 3	6.48 (3.19)	6.45 (2.83)			Group: $F_{(1, 68)} = 1.637$, $p = 0.205$
					Interaction: $F_{(1, 68)} = 1.779$, $p = 0.187$
					t-tests: t2 = 2.003, p = 0.049; t3 = 0.046, p = 0.964
Desired support					
Time 2	7.83 (2.64)	7.65 (2.21))	$F_{(1, 34)} = 0.160$, $p = 0.691$	$F_{(1, 34)} = 0.267$, $p = 0.608$	Time: $F_{(1, 68)} = 0.401$, $p = 0.528$
Time 3	7.59 (2.54)	7.42 (2.42)			Group: $F_{(1, 68)} = 0.154$, $p = 0.696$
					Interaction: $F_{(1, 68)} = 0.001$, $p = 0.985$
					t-tests: t2 = 0.319, p = 0.751; t3 = 0.290, p = 0.773
Support gap-					
Time 2	-0.14 (2.89)	-1.20 (2.99)	$F_{(1, 34)} = 2.445$, $p = 0.127$	$F_{(1, 34)} = 0.072$, $p = 0.790$	Time: $F_{(1, 68)} = 0.567$, $p = 0.454$
Time 3	-1.11 (2.96)	-0.97 (3.59)			Group: $F_{(1, 68)} = 0.663$, $p = 0.418$
					Interaction: $F_{(1, 68)} = 1.460$, $p = 0.231$
					t-tests: t2 = 1.495, p = 0.140; t3 = -0.176, p = 0.861

Time 2: 4-8 weeks post-MI; Time 3: 6-months post-MI

Appendix E- 2. Repeated measures ANOVA on the 35 MI couples' coping at assessment two and assessment three

Coping strategy	Patient (M.SD)	Spouse (M, SD)	'Time effect' within patients	'Time effect' within spouses	Couples together (time, group, interaction, independent t-test)
Active coping Time 1 Time 2	4.06 (1.73) 4.03 (1.67)	3.49 (1.70) 3.14 (1.85)	$F_{(1, 34)} = 0.009$, $p = 0.925$	$F_{(1, 34)} = 1.250$, $p = 0.271$	Time: $F_{(1, 68)} = 0.743$, $p = 0.392$ Group: $F_{(1, 68)} = 4.191$, $p = 0.045$ Interaction: $F_{(1, 68)} = 0.532$, $p = 0.468$ t-tests: t2 = 1.392, p = 0.169; t3 = 2.102, p = 0.039
Denial Time 2 Time 3	1.43 (1.75) 1.00 (1.41)	1.89 (2.37) 1.26 (1.87)	$F_{(1, 34)} = 2.647$, $p = 0.113$	$F_{(1, 34)} = 3.612$, $p = 0.066$	Time: $F_{(1, 68)} = 6.251$, $p = 0.015$ Group: $F_{(1, 68)} = 0.806$, $p = 0.372$ Interaction: $F_{(1, 68)} = 0.224$, $p = 0.638$ t-tests: t2 = -0.916, p = 0.363; t3 = -0.6489, p = 0.518
Drug abuse Time 2 Time 3	0.46 (1.22) 0.29 (0.89)	0.37 (0.88) 0.60 (1.22)	$F_{(1, 34)} = 0.686$, $p = 0.413$	$F_{(1, 34)} = 1.033$, $p = 0.317$	Time: $F_{(1, 68)} = 0.035$, $p = 0.852$ Group: $F_{(1, 68)} = 0.315$, $p = 0.577$ Interaction: $F_{(1, 68)} = 1.713$, $p = 0.195$ t-tests: t2 = 0.337, p = 0.737; t3 = -1.231, p = 0.222
Accepting emotional support Time 2 Time 3	4.31 (1.66) 3.29 (1.95)	2.69 (1.92) 2.14 (1.77)	$F_{(1, 34)} = 13.256$, $p = 0.001$ (ES: partial $\eta^2 = 0.281$)	$F_{(1, 34)} = 3.168$, $p = 0.084$	Time: $F_{(1, 68)} = 14.289$, $p < 0.001$ (ES: partial $\eta^2 = 0.174$) Group: $F_{(1, 68)} = 12.995$, $p = 0.001$ (ES: partial $\eta^2 = 0.001$) Interaction: $F_{(1, 68)} = 1.385$, $p = 0.247$ t-tests: t2 = 3.796, p < 0.001; t3 = 2.569, p = 0.012
Behaviour disengagement Time 2 Time 3	0.60 (1.04) 0.43 (0.85)	0.60 (1.22) 0.60 (1.06)	$F_{(1, 34)} = 0.745$, $p = 0.394$	$F_{(1, 34)} = 0.000$, $p = 1.000$	Time: $F_{(1, 68)} = 0.304$, $p = 0.583$ Group: $F_{(1, 68)} = 0.189$, $p = 0.665$ Interaction: $F_{(1, 68)} = 0.304$, $p = 0.583$ t-tests: t2 = 0.000, p = 1.000; t3 = -0.745, p = 0.459
Positive reframing Time 2 Time 3	2.83 (1.67) 2.60 (1.70)	2.60 (2.05) 2.46 (1.44)	$F_{(1, 34)} = 0.646$, $p = 0.427$	$F_{(1, 34)} = 0.233$, $p = 0.632$	Time: $F_{(1, 68)} = 0.819$, $p = 0.369$ Group: $F_{(1, 68)} = 0.268$, $p = 0.606$ Interaction: $F_{(1, 68)} = 0.044$, $p = 0.835$ t-tests: t2 = 0.512, p = 0.610; t3 = 0.379, p = 0.706
Self-distraction Time 2 Time 3	2.14 (1.61) 2.43 (1.77)	2.23 (1.82) 2.23 (2.00)	$F_{(1, 34)} = 0.924$, $p = 0.343$	$F_{(1, 34)} = 0.000$, $p = 1.000$	Time: $F_{(1, 68)} = 0.428$, $p = 0.515$ Group: $F_{(1, 68)} = 0.024$, $p = 0.878$ Interaction: $F_{(1, 68)} = 0.428$, $p = 0.515$ t-tests: t2 = -0.209, p = 0.835; t3 = 0.443, p = 0.659
Venting Time 2 Time 3	1.43 (1.70) 1.03 (1.36)	1.63 (1.59) 1.37 (1.61)	$F_{(1, 34)} = 3.934$, $p = 0.055$	$F_{(1, 34)} = 2.302$, $p = 0.138$	Time: $F_{(1, 68)} = 4.626$, $p = 0.035$ Group: $F_{(1, 68)} = 0.625$, $p = 0.432$ Interaction: $F_{(1, 68)} = 0.219$, $p = 0.642$ t-tests: t2 = -0.508, p = 0.613; t3 = -0.962, p = 0.339
Accepting instrumental support Time 2 Time 3	2.77 (1.85) 2.49 (1.79)	1.97 (1.87) 1.43 (1.75)	$F_{(1, 34)} = 1.977$, $p = 0.196$	$F_{(1, 34)} = 3.392$, $p = 0.074$	Time: $F_{(1, 68)} = 5.048$, $p = 0.028$ Group: $F_{(1, 68)} = 5.583$, $p = 0.021$ Interaction: $F_{(1, 68)} = 0.486$, $p = 0.488$ t-tests: t2 = 1.800, p = 0.076; t3 = 2.497, p = 0.015
Acceptance Time 2 Time 3	4.74 (1.52) 4.34 (1.51)	4.54 (1.62) 4.57 (1.79)	$F_{(1, 34)} = 1.975$, $p = 0.169$	$F_{(1, 34)} = 0.011$, $p = 0.915$	Time: $F_{(1, 68)} = 0.905$, $p = 0.345$ Group: $F_{(1, 68)} = 0.002$, $p = 0.966$ Interaction: $F_{(1, 68)} = 1.205$, $p = 0.276$ t-tests: t2 = 0.533, p = 0.596; t3 = -0.577, p = 0.566
Self-blame Time 2 Time 3	1.11 (1.28) 0.94 (1.33)	1.00 (1.65) 1.17 (1.81)	$F_{(1, 34)} = 0.574$, $p = 0.454$	$F_{(1, 34)} = 0.946$, $p = 0.338$	Time: $F_{(1, 68)} = 0.000$, $p = 1.000$ Group: $F_{(1, 68)} = 0.029$, $p = 0.866$ Interaction: $F_{(1, 68)} = 1.428$, $p = 0.236$ t-tests: t2 = 0.325, p = 0.747; t3 = -0.603, p = 0.548
Religion Time 2 Time 3	1.69 (2.44) 1.37 (2.16)	2.69 (2.52) 2.51 (2.56)	$F_{(1, 34)} = 1.974$, $p = 0.169$	$F_{(1, 34)} = 1.828$, $p = 0.185$	Time: $F_{(1, 68)} = 2.636$, $p = 0.109$ Group: $F_{(1, 68)} = 3.669$, $p = 0.060$ Interaction: $F_{(1, 68)} = 0.228$, $p = 0.635$ t-tests: t2 = -1.689, p = 0.096; t3 = -2.020, p = 0.047
Humour Time 2 Time 3	2.66 (2.11) 2.20 (2.07)	0.74 (1.20) 0.86 (1.31)	$F_{(1, 34)} = 2.207$, $p = 0.147$	$F_{(1, 34)} = 0.050$, $p = 0.825$	Time: $F_{(1, 68)} = 0.735$, $p = 0.394$ Group: $F_{(1, 68)} = 20.406$ $p < 0.001$ (ES: partial $\eta^2 = 0.231$) Interaction: $F_{(1, 68)} = 2.043$, $p = 0.158$ T-tests: t2 = 4.663, p < 0.001; t3 = 3.244, p = 0.002
Planning Time 2 Time 3	3.51 (1.63) 3.17 (2.09)	3.43 (1.77) 2.34 (1.77)	$F_{(1, 34)} = 0.843$, $p = 0.365$	$F_{(1, 34)} = 11.442$, $p = 0.002$ (ES: partial $\eta^2 = 0.252$)	Time: $F_{(1, 68)} = 9.108$, $p = 0.004$ (ES: partial $\eta^2 = 0.118$) Group: $F_{(1, 68)} = 1.560$, $p = 0.216$ Interaction: $F_{(1, 68)} = 2.463$, $p = 0.121$ t-tests: t2 = 0.210, p = 0.834; t3 = 1.790, p = 0.078

Time 2: 4-8 weeks post-MI; Time 3: 6-months post-MI

Appendix E- 3. Comparison results between couples with and without controlling 'gender'

Couples' differences in the following variables (patients – spouses)	T test without controlling 'gender'		Comparison after controlling 'gender'	
	T value	P value	F value (df = 1)	P value
Time 1: during patients' hospitalisation				
Depression	-3.721	< 0.001	1.993	0.163
State anxiety	-4.463	< 0.001	4.664	0.034
Negative affect	-3.447	0.001	3.809	0.055
Time 2: 4-8 weeks post-MI				
State anxiety	-3.688	< 0.001	3.511	0.065
Total perceived support	3.513	0.001	11.13	0.001
Special one's support	3.799	< 0.001	6.92	0.011
Accepting emotional support coping	3.796	< 0.001	11.963	0.001
Humour coping	4.663	< 0.001	13.954	< 0.001
Time 3: 6-month post-MI				
State anxiety	-3.052	0.003	5.281	0.025
Total perceived support	3.155	0.003	5.237	0.025
Special one's support coping	3.593	0.001	6.541	0.013
Humour coping	3.244	0.002	0.847	0.361

Appendix E- 4. Correlations between the 35 MI couples' moods at three assessments

	Spouses: Time 1				Spouses: Time 2				Spouses: Time 3			
patients	1	2	3	4	1	2	3	4	1	2	3	4
1 Depression	-0.048 p = 0.784	0.108 p = 0.537	0.048 p = 0.782	-0.100 p = 0.568	0.033 p = 0.849	0.131 p = 0.454	0.264 p = 0.126	-0.062 p = 0.722	0.119 p = 0.497	0.134 p = 0.444	-0.011 p = 0.948	-0.031 p = 0.858
2 State anxiety	-0.133 p = 0.447	-0.162 p = 0.353	0.158 p = 0.364	-0.290 p = 0.090	-0.041 p = 0.815	-0.005 p = 0.980	0.349 p = 0.040	-0.077 p = 0.660	-0.143 p = 0.412	-0.198 p = 0.255	0.137 p = 0.432	-0.267 p = 0.121
3 Positive affect	0.338 p = 0.047	0.094 p = 0.593	0.184 p = 0.290	0.329 p = 0.054	0.141 p = 0.418	0.261 p = 0.130	-0.057 p = 0.746	0.185 p = 0.288	-0.344 p = 0.043	-0.266 p = 0.122	0.370 p = 0.029	-0.305 p = 0.075
4 Negative affect	0.000 p = 0.998	-0.016 p = 0.926	0.338 p = 0.047	0.033 p = 0.849	-0.063 p = 0.718	0.078 p = 0.656	0.226 p = 0.192	-0.108 p = 0.537	0.042 p = 0.812	0.145 p = 0.407	0.205 p = 0.237	0.093 p = 0.596

Appendix E- 5. Correlations of the 35 MI patients' moods at three assessments

patients	Time 1			Time 2			Time 3		
	1	2	3	1	2	3	1	2	3
1 Depression									
2 State anxiety	0.671, p < 0.001			0.658, p < 0.001			0.700, p < 0.001		
3 Positive affect	-0.329, p = 0.054	-0.049, p = 0.779		-0.105, p = 0.547	-0.075, p = 0.668		-0.161, p = 0.355	-0.185, p = 0.286	
4 Negative affect	0.584, p < 0.001	0.629, p < 0.001	0.117 p = 0.504	0.766, p < 0.001	0.664, p < 0.001	0.090 p = 0.608	0.546, p = 0.001	0.474, p = 0.004	-0.112 p = 0.520

Appendix E- 6. Correlations of the 35 MI spouses' moods at three assessments

spouses	Time 1			Time 2			Time 3		
	1	2	3	1	2	3	1	2	3
1. Depression									
2. State anxiety	0.687, p < 0.001			0.758, p < 0.001			0.802, p < 0.001		
3. Positive affect	-0.295, p = 0.086	-0.459, p = 0.006		-0.227, p = 0.190	-0.470, p = 0.004		-0.471, p = 0.004	-0.443, p = 0.008	
4. Negative affect	0.807, p < 0.001	0.654, p < 0.001	-0.176 p = 0.312	0.844, p < 0.001	0.759, p < 0.001	-0.135 p = 0.440	0.870, p < 0.001	0.823, p < 0.001	-0.308 p = 0.072

Appendix E- 7. Long-term correlations of the 35 MI couples' moods over six months

2nd time	Patients' state mood at the acute stage			
Patients' mood	1	2	3	4
1.Depression	0.484**	0.621**	0.007	0.499**
2.State anxiety	0.256	0.530**	-0.042	0.330
3.Positive affect	-0.117	0.102	0.530** 99% CI: d =	-0.057
4.Negative affect	0.304	0.595**	0.122	0.534**

3rd time	Patients' state mood at the acute stage			
Patients' mood	1	2	3	4
1.Depression	0.470**	0.482**	-0.108	0.426
2.State anxiety	0.291	0.385	-0.086	0.460**
3.Positive affect	-0.096	0.089	0.455**	-0.092
4.Negative affect	0.392	0.451**	0.100	0.295

3rd time	Patients' state mood after 4-8 weeks			
Patients' mood	1	2	3	4
1.Depression	0.662**	0.363	0.102	0.583**
2.State anxiety	0.449**	0.440**	0.064	0.580**
3.positive affect	-0.012	-0.047	0.381	-0.018
4.Negative affect	0.433**	0.394	0.288	0.651**

** p ≤ 0.01

Appendix E- 8. Long-term correlations of the 35 MI spouses' moods over the first six months

2nd time Spouses' mood	Spouses' state mood at the acute stage			
	1	2	3	4
1.Depression	0.776**	0.650**	-0.396	0.688**
2.State anxiety	0.600**	0.622**	-0.563**	0.454**
3.Positive affect	-0.092	-0.235	0.766**	0.027
4.Negative affect	0.800**	0.706**	-0.315	0.778**

3rd time Spouses' mood	Spouses' state mood at the acute stage			
	1	2	3	4
1.Depression	0.603**	0.388	-0.425	0.443**
2.State anxiety	0.531**	0.493**	-0.408	0.459**
3.Positive affect	-0.118	-0.279	0.688**	-0.163
4.Negative affect	0.682**	0.484**	-0.376	0.585**

3rd time Spouses' mood	Spouses' state mood after 4-8 weeks			
	1	2	3	4
1.Depression	0.732**	0.654**	-0.327	0.616**
2.State anxiety	0.700**	0.746**	-0.323	0.674**
3.Positive affect	-0.252	-0.403	0.660**	-0.253
4.Negative affect	0.756**	0.605**	-0.168	0.704**

** $p \leq 0.01$

Appendix E- 9. Correlations of the 35 MI couples' same types of illness perceptions at three assessments

35 couples' same types of illness perceptions	T1	T2	T3
Causal component 1: Stress causes	0.603***, p < 0.001	0.567***, p < 0.001	0.403, p = 0.016
Causal component 2: External/uncontrollable causes	0.534***, p = 0.001	0.469**, p = 0.001	0.257, p = 0.136
Causal component 3: Unhealthy lifestyles	0.681***, p < 0.001	0.314, p = 0.067	0.603***, p < 0.001
Consequence component 1: Physical consequences	0.442**, p = 0.008	0.357, p = 0.035	0.322, p = 0.059
Timeline	0.254, p = 0.140	0.329, p = 0.053	0.147, p = 0.399
Control component 1: Active control	0.585***, p < 0.001	0.085, p =0.626	0.284, p = 0.099
Control component 2: Passive control	0.132, p = 0.450	0.289, p = 0.093	0.439**, p = 0.008
Future MI threat	0.169, p = 0.332	0.122, p = 0.486	0.243, p = 0.160
Symptom perception	0.620***, p < 0.001	0.693***, p < 0.001	0.600***, p < 0.001

T1: 4-5 days pos-MI (hospitalisation); T2: 4-8 weeks post-MI; T3: 6-months post-MI

** $p \leq 0.01$; *** $p \leq 0.001$

Appendix E- 10. Correlations between the 35 MI couples' illness perceptions at three assessments

Time 1	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0 603 p < 0.001	-0 078 p = 0 656	0 270 p = 0 116	0 310 p = 0 070	0 216 p = 0 214	-0 154 p = 0 377	0 129 p = 0 459	0 050 p = 0 777	-0 085 p = 0 628	-0 073 p = 0 677
External	0 137 p = 0 432	0 534 p = 0 001	-0 023 p = 0 896	0 086 p = 0 622	-0 220 p = 0 205	-0 301 p = 0 079	-0 039 p = 0 824	0 201 p = 0 246	-0 108 p = 0 538	-0 166 p = 0 342
Lifestyle	0 092 p = 0 599	-0 213 p = 0 220	0 681 p < 0 001	0 357 p = 0 035	0 138 p = 0 430	-0 108 p = 0 536	0 402 p = 0 017	0 224 p = 0 196	-0 202 p = 0 244	0 176 p = 0 313
Physical	0 430 p = 0 010	0 086 p = 0 621	0 258 p = 0 134	0 442 p = 0 008	0 227 p = 0 190	-0 007 p = 0 970	0 087 p = 0 620	0 013 p = 0 942	-0 159 p = 0 362	0 208 p = 0 230
Emotional	0 659 p < 0 001	-0 196 p = 0 258	0 446 p = 0 007	0 428 p = 0 010	0 324 p = 0 058	-0 095 p = 0 587	-0 058 p = 0 740	0 105 p = 0 549	-0 234 p = 0 175	0 138 p = 0 428
Timeline	0 021 p = 0 906	-0 309 p = 0 071	0 217 p = 0 210	0 193 p = 0 267	0 325 p = 0 057	0 254 p = 0 140	0 107 p = 0 542	-0 128 p = 0 465	-0 065 p = 0 710	0 184 p = 0 290
Active control	0 084 p = 0 630	0 029 p = 0 870	0 319 p = 0 061	0 114 p = 0 514	0 031 p = 0 859	-0 219 p = 0 206	0 585 p < 0 001	-0 100 p = 0 569	-0 089 p = 0 611	0 012 p = 0 946
Passive control	0 337 p = 0 048	0 384 p = 0 023	0 181 p = 0 298	-0 023 p = 0 896	-0 076 p = 0 663	-0 192 p = 0 270	0 090 p = 0 608	0 132 p = 0 450	-0 144 p = 0 410	0 010 p = 0 955
Future MI threat	0 038 p = 0 830	-0 094 p = 0 593	0 151 p = 0 387	0 301 p = 0 079	0 286 p = 0 096	0 360 p = 0 034	-0 051 p = 0 770	0 433 p = 0 009	0 169 p = 0 332	0 089 p = 0 613
Symptom perception	0 332 p = 0 052	0 017 p = 0 924	0 213 p = 0 220	0 402 p = 0 017	0 345 p = 0 042	0 040 p = 0 820	-0 059 p = 0 738	0 023 p = 0 897	-0 083 p = 0 637	0 620 p < 0 001

Time 2	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.567 p < 0.001	0.261 p = 0.130	0.303 p = 0.076	0.310 p = 0.069	0.261 p = 0.129	0.084 p = 0.633	0.106 p = 0.536	0.173 p = 0.321	0.077 p = 0.659	0.044 p = 0.804
External	-0.092 p = 0.600	0.496 p = 0.002	0.025 p = 0.885	-0.154 p = 0.377	-0.217 p = 0.211	-0.079 p = 0.651	-0.063 p = 0.721	0.038 p = 0.827	0.133 p = 0.446	-0.188 p = 0.280
Lifestyle	0.285 p = 0.097	-0.007 p = 0.967	0.314 p = 0.067	0.383 p = 0.023	0.315 p = 0.066	0.063 p = 0.635	0.211 p = 0.223	0.310 p = 0.070	0.102 p = 0.559	0.316 p = 0.064
Physical	0.395 p = 0.019	0.109 p = 0.534	0.264 p = 0.125	0.357 p = 0.035	0.352 p = 0.038	0.084 p = 0.629	-0.021 p = 0.906	0.392 p = 0.020	-0.127 p = 0.466	0.356 p = 0.036
Emotional	0.488 p = 0.003	0.321 p = 0.060	0.365 p = 0.031	0.333 p = 0.051	0.404 p = 0.016	0.173 p = 0.319	-0.005 p = 0.978	0.460 p = 0.005	0.164 p = 0.348	0.316 p = 0.064
Timeline	0.151 p = 0.388	-0.186 p = 0.285	0.143 p = 0.412	0.131 p = 0.454	0.230 p = 0.184	0.329 p = 0.053	0.063 p = 0.719	-0.011 p = 0.951	0.071 p = 0.687	0.045 p = 0.799
Active control	0.229 p = 0.185	-0.099 p = 0.572	0.037 p = 0.834	-0.132 p = 0.449	-0.093 p = 0.596	-0.078 p = 0.655	0.085 p = 0.626	-0.084 p = 0.630	-0.155 p = 0.373	-0.077 p = 0.660
Passive control	0.087 p = 0.618	0.093 p = 0.597	0.253 p = 0.143	0.395 p = 0.019	0.288 p = 0.094	0.052 p = 0.766	0.027 p = 0.879	0.289 p = 0.093	0.022 p = 0.902	0.184 p = 0.290
Future MI threat	0.062 p = 0.722	-0.237 p = 0.171	0.041 p = 0.817	0.154 p = 0.377	0.155 p = 0.374	0.304 p = 0.076	0.010 p = 0.955	0.122 p = 0.486	0.122 p = 0.486	0.195 p = 0.261
Symptom perception	0.535 p = 0.001	0.217 p = 0.211	0.308 p = 0.071	0.535 p = 0.001	0.512 p = 0.002	0.250 p = 0.147	0.106 p = 0.546	0.259 p = 0.132	0.160 p = 0.358	0.693 p < 0.001

Time 3	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.403 p = 0.016	-0.057 p = 0.747	0.244 p = 0.158	0.142 p = 0.414	0.165 p = 0.344	-0.004 p = 0.982	0.307 p = 0.073	-0.093 p = 0.597	-0.097 p = 0.581	-0.102 p = 0.559
External	0.233 p = 0.178	0.257 p = 0.136	0.147 p = 0.399	0.181 p = 0.298	0.116 p = 0.508	0.205 p = 0.237	0.093 p = 0.594	0.182 p = 0.296	0.128 p = 0.464	0.041 p = 0.816
Lifestyle	0.244 p = 0.158	0.173 p = 0.319	0.603 p < 0.001	0.398 p = 0.018	0.401 p = 0.017	0.072 p = 0.680	0.391 p = 0.020	0.077 p = 0.658	-0.085 p = 0.627	0.118 p = 0.500
Physical	0.270 p = 0.116	0.144 p = 0.409	0.108 p = 0.536	0.322 p = 0.059	0.417 p = 0.013	-0.069 p = 0.692	0.136 p = 0.437	0.044 p = 0.802	0.158 p = 0.365	0.414 p = 0.013
Emotional	0.314 p = 0.066	0.062 p = 0.722	0.202 p = 0.246	0.468 p = 0.005	0.488 p = 0.003	0.063 p = 0.717	-0.218 p = 0.209	0.235 p = 0.175	0.337 p = 0.048	0.501 p = 0.002
Timeline	0.143 p = 0.411	-0.073 p = 0.678	0.210 p = 0.225	0.313 p = 0.067	0.337 p = 0.048	0.147 p = 0.399	0.173 p = 0.322	0.094 p = 0.592	0.213 p = 0.218	0.172 p = 0.324
Active control	0.407 p = 0.015	0.127 p = 0.469	0.100 p = 0.568	0.036 p = 0.839	-0.022 p = 0.900	0.087 p = 0.620	0.284 p = 0.099	-0.179 p = 0.305	-0.210 p = 0.226	-0.088 p = 0.617
Passive control	0.076 p = 0.664	0.346 p = 0.042	0.312 p = 0.068	0.380 p = 0.024	0.440 p = 0.008	0.081 p = 0.642	0.022 p = 0.900	0.439 p =0.008	0.258 p = 0.134	0.281 p = 0.101
Future MI threat	-0.158 p = 0.366	-0.177 p = 0.310	0.064 p = 0.713	0.088 p = 0.615	0.036 p = 0.837	-0.017 p = 0.924	-0.403 p = 0.016	0.010 p = 0.957	0.243 p = 0.160	0.272 p = 0.114
Symptom perception	0.192 p = 0.270	0.012 p = 0.947	0.178 p = 0.306	0.336 p = 0.048	0.444 p = 0.007	-0.090 p = 0.608	-0.099 p = 0.570	-0.004 p = 0.981	0.375 p = 0.026	0.600 p < 0.001

(continued)

Time 1	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.603 p < 0.001									
External		0.534 p = 0.001								
Lifestyle			0.681 p < 0.001							
Physical	0.430 p = 0.010			0.442 p = 0.008						
Emotional	0.659 p < 0.001		0.446 p = 0.007	0.428 p = 0.010						
Timeline										
Active control							0.585 p < 0.001			
Passive control										
Future MI threat								0.433 p = 0.009		
Symptom perception										0.620 p < 0.001

Time 2	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.567 p < 0.001									
External		0.496 p = 0.002								
Lifestyle										
Physical										
Emotional	0.488 p = 0.003							0.460 p = 0.005		
Timeline										
Active control										
Passive control										
Future MI threat										
Symptom perception	0.535 p = 0.001			0.535 p = 0.001	0.512 p = 0.002					0.693 p < 0.001

Time 3	patients									
Spouses	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress										
External										
Lifestyle			0.603 p < 0.001							
Physical										
Emotional				0.468 p = 0.005	0.488 p = 0.003					0.501 p = 0.002
Timeline										
Active control										
Passive control					0.440 p = 0.008			0.439 p =0.008		
Future MI threat										
Symptom perception					0.444 p = 0.007					0.600 p < 0.001

Appendix E- 11. Correlations between the 35 patients' illness perceptions and the 35 spouses' illness perceptions during patients' hospitalisation

	Patients' illness perceptions								
Time 1	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat
External	0.150 p = 0.388								
Lifestyle	0.447 p =0.007	-0.140 p = 0.422							
Physical	0.221 p = 0.202	-0.003 p = 0.984	0.245 p = 0.156						
Emotional	0.126 p = 0.469	-0.318 p = 0.063	0.181 p = 0.298	0.598 p < 0.001					
Timeline	0.041 p = 0.814	-0.238 p = 0.189	0.048 p = 0.785	0.092 p = 0.598	0.214 p = 0.217				
Active control	0.013 p = 0.940	-0.078 p = 0.654	0.417 p = 0.013	-0.001 p = 0.994	0.120 p = 0.491	-0.108 p = 0.536			
Passive control	-0.095 p = 0.588	0.142 p = 0.416	0.141 p = 0.419	0.537 p = 0.001	0.285 p = 0.098	0.153 p = 0.380	-0.135 p = 0.439		
MI threat	0.021 p = 0.906	-0.055 p = 0.755	-0.003 p = 0.986	0.064 p = 0.714	0.072 p = 0.680	0.617 p < 0.001	-0.147 p = 0.400	0.017 p = 0.924	
Symptom perception	0.108 p = 0.538	-0.135 p = 0.439	0.146 p = 0.403	0.312 p = 0.068	0.333 p = 0.051	0.142 p = 0.417	-0.347 p = 0.041	0.226 p = 0.191	0.147 p = 0.398

	Spouses' illness perceptions								
Time 1	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat
External	0.009 p = 0.959								
Lifestyle	0.309 p = 0.071	-0.212 p = 0.222							
Physical	0.540 p = 0.001	0.087 p = 0.621	0.244 p = 0.158						
Emotional	0.554 p = 0.001	0.140 p = 0.422	0.202 p =0.244	0.533 p =- 0.001					
Timeline	0.202 p = 0.245	-0.538 p = 0.001	0.384 p = 0.023	0.501 p = 0.002	0.098 p = 0.575				
Active control	0.185 p = 0.287	0.130 p = 0.458	0.380 p = 0.024	0.101 p = 0.565	0.109 p = 0.534	-0.114 p = 0.515			
Passive control	0.097 p = 0.580	0.511 p = 0.002	-0.018 p = 0.919	0.195 p = 0.262	0.167 p = 0.338	-0.381 p = 0.024	0.095 p = 0.587		
MI threat	0.188 p = 0.279	-0.177 p = 0.309	0.339 p = 0.046	-0.094 p = 0.589	-0.089 p = 0.610	0.026 p = 0.880	0.002 p = 0.991	-0.072 p = 0.681	
Symptom perception	0.207 p = 0.234	-0.152 p = 0.384	0.264 p = 0.126	0.468 p = 0.005	0.285 p = 0.097	0.381 p = 0.024	0.103 p = 0.556	-0.071 p = 0.685	0.095 p = 0.589

Appendix E- 12. Correlations between the 35 patients' illness perceptions and the 35 spouses' illness perceptions at assessment two

	Patients' illness perceptions								
Time 2	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat
External	0.330 p = 0.053								
Lifestyle	0.624 p < 0.001	0.350 p = 0.039							
Physical	0.573 p < 0.001	0.188 p = 0.280	0.563 p < 0.001						
Emotional	0.602 p < 0.001	-0.004 p = 0.981	0.432 p = 0.010	0.779 p < 0.001					
Timeline	0.427 p = 0.011	0.015 p = 0.934	0.174 p = 0.317	0.357 p = 0.035	0.437 p = 0.009				
Active control	0.154 p = 0.376	0.109 p = 0.533	0.378 p = 0.025	0.178 p = 0.307	0.193 p = 0.266	-0.120 p = 0.492			
Passive control	0.214 p = 0.217	0.475 p = 0.004	0.308 p = 0.071	0.263 p = 0.127	0.257 p = 0.136	-0.180 p = 0.301	0.026 p = 0.883		
MI threat	0.196 p = 0.260	0.338 p = 0.047	0.072 p = 0.681	0.251 p = 0.146	0.254 p = 0.141	0.557 p = 0.001	-0.097 p = 0.578	-0.014 p = 0.934	
Symptom perception	0.489 p = 0.003	0.152 p = 0.384	0.321 p = 0.060	0.567 p < 0.001	0.597 p < 0.001	0.266 p = 0.123	0.251 p = 0.146	0.078 p = 0.656	0.330 p = 0.053

	Spouses' illness perceptions								
Time 2	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat
External	-0.014 p = 0.938								
Lifestyle	0.269 p = 0.118	-0.248 p = 0.151							
Physical	0.285 p = 0.097	0.030 p = 0.863	0.452 p = 0.006						
Emotional	0.411 p = 0.014	0.212 p = 0.222	0.354 p = 0.037	0.526 p = 0.001					
Timeline	-0.107 p = 0.541	-0.341 p = 0.045	0.213 p = 0.219	0.014 p = 0.937	0.059 p = 0.737				
Active control	0.359 p = 0.034	0.209 p = 0.229	0.102 p = 0.560	0.202 p = 0.245	0.223 p = 0.198	-0.373 p = 0.027			
Passive control	-0.187 p = 0.283	-0.018 p = 0.919	0.262 p = 0.128	0.403 p = 0.016	-0.036 p = 0.835	-0.048 p = 0.784	-0.056 p = 0.750		
MI threat	-0.223 p = 0.199	-0.436 p = 0.009	0.185 p = 0.288	0.115 p = 0.512	0.079 p = 0.650	0.489 p = 0.003	-0.487 p =0.003	0.062 p = 0.725	
Symptom perception	0.129 p = 0.459	-0.165 p = 0.344	0.288 p = 0.094	0.595 p < 0.001	0.446 p = 0.007	0.353 p = 0.037	-0.116 p = 0.506	0.278 p = 0.108	0.384 p = 0.023

Appendix E- 13. Correlations between the 35 patients' illness perceptions and the 35 spouses' illness perceptions at assessment three

	Patients' illness perceptions								
Time 3	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat
External	0.340 p = 0.045								
Lifestyle	0.451 p = 0.007	0.250 p = 0.148							
Physical	0.542 p = 0.001	0.301 p = 0.079	0.687 p < 0.001						
Emotional	0.552 p = 0.001	0.338 p = 0.047	0.552 p = 0.001	0.819 p < 0.001					
Timeline	0.393 p = 0.020	-0.121 p = 0.488	0.242 p = 0.161	0.317 p = 0.063	0.350 p = 0.039				
Active control	0.150 p = 0.389	-0.005 p = 0.977	0.242 p = 0.161	-0.088 p = 0.617	-0.040 p = 0.819	-0.032 p = 0.854			
Passive control	0.159 p = 0.360	0.440 p = 0.008	0.389 p = 0.021	0.487 p = 0.003	0.419 p = 0.012	-0.105 p = 0.548	-0.169 p = 0.331		
MI threat	0.221 p = 0.203	0.070 p = 0.689	0.057 p = 0.744	0.387 p = 0.022	0.538 p = 0.001	0.381 p = 0.024	-0.448 p = 0.007	0.210 p =0.226	
Symptom perception	0.264 p = 0.126	0.014 p = 0.938	0.280 p = 0.104	0.527 p = 0.001	0.627 p < 0.001	0.295 p = 0.085	-0.360 p = 0.034	0.131 p = 0.452	0.566 p < 0.001

	Spouses' illness perceptions								
Time 3	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat
External	-0.088 p = 0.616								
Lifestyle	0.585 p < 0.001	0.069 p = 0.694							
Physical	0.292 p = 0.089	0.121 p = 0.489	0.322 p = 0.060						
Emotional	0.167 p = 0.337	0.144 p = 0.409	0.184 p = 0.289	0.644 p < 0.001					
Timeline	-0.118 p = 0.498	-0.128 p = 0.465	0.183 p = 0.292	0.236 p = 0.171	0.225 p = 0.194				
Active control	0.318 p = 0.063	0.275 p = 0.110	0.097 p = 0.581	0.102 p = 0.560	0.079 p = 0.651	-0.397 p = 0.018			
Passive control	-0.084 p = 0.633	0.255 p = 0.139	0.259 p = 0.133	0.212 p = 0.221	0.101 p = 0.565	-0.077 p = 0.658	-0.068 p = 0.699		
MI threat	-0.235 p = 0.173	0.082 p = 0.639	-0.093 p = 0.596	0.058 p = 0.739	0.220 p = 0.204	0.456 p = 0.006	-0.233 p = 0.178	-0.048 p = 0.785	
Symptom perception	0.252 p = 0.144	-0.216 p =0.212	0.310 p = 0.070	0.568 p < 0.001	0.474 p = 0.004	0.354 p = 0.037	-0.172 p = 0.322	0.137 p = 0.434	0.248 p = 0.151

Appendix E- 14. Long-term correlation between the 35 patients' illness perceptions for the first six months

	Time 1									
Time 2	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.507 p = 0.002	-0.379 p = 0.025	0.327 p = 0.055	0.409 p = 0.015	0.479 p = 0.004	0.274 p = 0.112	0.150 p = 0.389	0.095 p = 0.586	0.014 p = 0.938	0.013 p = 0.943
External	0.430 p = 0.010	0.392 p = 0.020	0.179 p = 0.302	0.236 p = 0.173	0.134 p = 0.443	0.109 p = 0.534	-0.082 p = 0.639	0.351 p = 0.039	-0.029 p = 0.869	-0.007 p = 0.970
Lifestyle	0.247 p = 0.152	-0.247 p = 0.153	0.529 p = 0.001	0.357 p = 0.035	0.445 p = 0.007	0.134 p = 0.441	0.458 P = 0.006	0.322 p = 0.059	-0.011 p = 0.948	-0.055 p = 0.752
Physical	0.242 p = 0.161	-0.360 p = 0.024	0.300 p = 0.080	0.579 p < 0.001	0.657 p < 0.001	0.148 p = 0.396	0.189 p = 0.276	0.159 p = 0.361	0.019 p = 0.912	0.139 p = 0.427
Emotional	0.192 p = 0.270	-0.538 p = 0.001	0.177 p = 0.309	0.529 p = 0.001	0.653 p < 0.001	0.308 p = 0.072	0.036 p = 0.836	0.060 p = 0.733	0.244 p = 0.157	0.196 p = 0.259
Timeline	0.210 p = 0.226	-0.424 p = 0.011	0.257 p = 0.136	0.182 p = 0.295	0.255 p = 0.139	0.678 p < 0.001	0.039 p = 0.823	-0.052 p = 0.765	0.322 p = 0.059	0.120 p = 0.492
Active control	0.035 p = 0.842	-0.121 p = 0.489	0.1078 p = 0.535	0.127 p = 0.468	0.198 p = 0.254	-0.109 p = 0.535	0.573 p < 0.001	-0.147 p = 0.399	-0.240 p = 0.165	-0.024 p = 0.892
Passive control	0.043 p = 0.805	0.107 p = 0.539	0.154 p = 0.377	0.543 p = 0.001	0.432 p = 0.010	-0.123 p = 0.483	-0.086 p = 0.622	0.599 p < 0.001	-0.178 p = 0.306	0.088 p = 0.615
Future MI threat	0.412 p = 0.014	-0.121 p = 0.488	0.332 p = 0.051	-0.019 p = 0.915	0.146 p = 0.401	0.458 p = 0.006	-0.182 p = 0.295	-0.130 p = 0.458	0.271 p = 0.116	0.198 p = 0.255
Symptom perception	0.186 p = 0.285	-0.507 p = 0.002	0.168 p = 0.335	0.233 p = 0.178	0.439 p = 0.008	0.318 p = 0.063	-0.083 p = 0.634	-0.016 p = 0.927	-0.007 p = 0.968	0.415 p = 0.013

	Time 1									
Time 3	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.458 p = 0.006	-0.169 p = 0.333	0.234 p = 0.176	0.225 p = 0.194	0.193 p = 0.268	0.157 p = 0.367	0.195 p = 0.261	0.147 p = 0.399	-0.085 p = 0.628	-0.066 p = 0.707
External	0.236 p = 0.172	0.289 p = 0.092	0.099 p = 0.570	0.323 p = 0.058	-0.060 p = 0.731	-0.162 p = 0.351	0.015 p = 0.930	0.310 p = 0.070	-0.178 p = 0.307	0.096 p = 0.583
Lifestyle	0.152 p = 0.383	-0.261 p = 0.130	0.576 p < 0.001	0.180 p = 0.300	0.280 p = 0.103	-0.117 p = 0.503	0.459 p = 0.006	0.142 p = 0.414	-0.165 p = 0.344	0.007 p = 0.970
Physical	0.208 p = 0.230	-0.106 p = 0.544	0.465 p = 0.005	0.492 p = 0.003	0.486 p = 0.003	0.120 p = 0.491	0.357 p = 0.035	0.269 p = 0.118	-0.014 p = 0.938	0.047 p = 0.787
Emotional	0.251 p = 0.147	-0.284 p = 0.098	0.396 p = 0.018	0.522 p = 0.001	0.412 p = 0.014	0.215 p = 0.216	0.208 p = 0.231	0.266 p = 0.123	0.112 p = 0.523	0.150 p = 0.388
Timeline	0.074 p = 0.674	-0.181 p = 0.297	0.113 p = 0.520	-0.075 p = 0.668	0.109 p = 0.532	0.509 p = 0.002	0.175 p = 0.316	-0.048 p = 0.783	0.116 p = 0.506	-0.024 p = 0.893
Active control	-0.019 p = 0.912	-0.234 p = 0.176	0.057 p = 0.746	0.071 p = 0.685	0.094 p = 0.593	-0.270 p = 0.117	0.287 p = 0.095	-0.059 p = 0.736	-0.262 p = 0.128	0.051 p = 0.772
Passive control	-0.065 p = 0.710	0.184 p = 0.291	0.230 p = 0.183	0.477 p = 0.004	0.295 p = 0.085	-0.041 p = 0.816	0.097 p = 0.580	0.625 p < 0.001	0.123 p = 0.480	0.022 p = 0.900
Future MI threat	-0.048 p = 0.782	-0.218 p = 0.209	0.020 p = 0.909	0.156 p = 0.372	0.301 p = 0.079	0.502 p = 0.002	0.095 p = 0.586	0.263 p = 0.126	0.219 p = 0.206	-0.024 p = 0.892
Symptom perception	0.066 p = 0.706	-0.197 p = 0.256	0.140 p = 0.421	0.115 p = 0.511	0.153 p = 0.382	0.005 p = 0.976	0.022 p = 0.902	-0.041 p = 0.817	-0.128 p = 0.463	0.093 p = 0.595

	Time 2									
Time 3	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	MI threat	Symptom
Stress	0.732 p < 0.001	0.372 p = 0.028	0.530 p = 0.001	0.337 p = 0.048	0.299 p = 0.081	0.365 p = 0.031	0.090 p = 0.609	0.129 p = 0.461	0.161 p = 0.356	0.228 p = 0.189
External	0.061 p = 0.729	0.367 p = 0.030	0.202 p = 0.245	0.118 p = 0.500	-0.007 p = 0.968	0.004 p = 0.984	0.208 p = 0.231	0.284 p = 0.098	-0.034 p = 0.845	-0.021 p = 0.903
Lifestyle	0.369 p = 0.029	0.168 p = 0.336	0.838 p < 0.001	0.425 p = 0.011	0.277 p = 0.107	0.108 p = 0.536	0.312 p = 0.068	0.229 p = 0.187	0.070 p = 0.689	0.215 p = 0.215
Physical	0.518 p = 0.001	0.402 p = 0.017	0.738 p < 0.001	0.583 p < 0.001	0.484 p = 0.003	0.267 p = 0.121	0.205 p = 0.238	0.473 p = 0.004	0.157 p = 0.367	0.331 p = 0.052
Emotional	0.554 p = 0.001	0.290 p = 0.091	0.658 p < 0.001	0.756 p < 0.001	0.630 p < 0.001	0.407 p = 0.015	0.155 p = 0.373	0.305 p = 0.075	0.265 p = 0.124	0.557 p = 0.001
Time-line	0.233 p = 0.178	0.155 p = 0.374	0.238 p = 0.169	0.257 p = 0.136	0.162 p = 0.352	0.677 p < 0.001	-0.092 p = 0.599	-0.170 p = 0.330	0.402 p = 0.017	0.210 p = 0.225
Active control	0.089 p = 0.611	-0.114 p = 0.516	0.090 p = 0.607	0.077 p = 0.658	0.060 p = 0.734	0.023 p = 0.895	0.338 p = 0.047	-0.178 p = 0.308	-0.153 p = 0.379	0.119 p = 0.495
Passive control	0.025 p = 0.887	0.360 p = 0.034	0.477 p = 0.004	0.229 p = 0.185	0.085 p = 0.628	-0.127 p = 0.467	0.010 p = 0.953	0.657 p < 0.001	-0.039 p = 0.824	-0.114 p = 0.515
Future MI threat	0.411 p = 0.014	0.327 p = 0.055	0.382 p = 0.023	0.484 p = 0.003	0.372 p = 0.028	0.329 p = 0.054	0.051 p = 0.773	0.250 p = 0.148	0.215 p = 0.215	0.418 p = 0.012
Symptom perception	0.340 p = 0.046	0.207 p = 0.233	0.361 p = 0.033	0.420 p = 0.012	0.311 p = 0.069	0.092 p = 0.600	0.055 p = 0.753	0.251 p = 0.145	0.248 p = 0.150	0.488 p = 0.003

Appendix E- 15. Long-term correlation between the 35 spouses' illness perceptions for the first six months

	Time 1									
Time 2	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	Threat	Symptom
Stress	0 770 p < 0.001	0 109 p = 0 532	0 076 p = 0 666	0 445 p = 0 007	0 475 p = 0 004	0 179 p = 0 303	0 074 p = 0 673	0 135 p = 0 441	-0 034 p = 0 846	-0 028 p = 0 875
External	-0 153 p = 0 382	0 599 p < 0 001	-0 260 p = 0 131	0 101 p = 0 564	0 032 p = 0 857	-0 362 p = 0 033	-0 091 p = 0 604	0 284 p = 0 098	-0 214 p = 0 216	-0 161 p = 0 356
Lifestyle	0 319 p = 0 062	0 015 p = 0 932	0 713 p < 0 001	0 331 p = 0 052	0 420 p = 0 012	0 335 p = 0 050	0 191 p = 0 271	0 057 p = 0 747	0 093 p = 0 597	0 249 p = 0 150
Physical	0 402 p = 0 017	0 218 p = 0 207	0 234 p = 0 176	0 602 p < 0 001	0 515 p = 0 002	0 100 p = 0 568	0 124 p = 0 479	0 293 p = 0 087	0 046 p = 0 791	0 261 p = 0 130
Emotional	0 538 p = 0 001	0 306 p = 0 074	0 132 p = 0 449	0 436 p = 0 009	0 793 p < 0 001	-0 024 p = 0 889	0 077 p = 0 661	0 231 p = 0 181	-0 195 p = 0 263	0 133 p = 0 446
Time-line	0 006 p = 0 975	-0 384 p = 0 023	0 332 p = 0 051	0 079 p = 0 654	-0 020 p = 0 908	0 577 p < 0 001	-0 053 p = 0 764	-0 355 p = 0 036	0 064 p = 0 715	0 121 p = 0 490
Active control	0 397 p = 0 018	0 242 p = 0 161	0 209 p = 0 227	0 421 p = 0 012	0 330 p = 0 053	-0 081 p = 0 642	0 610 p < 0 001	0 157 p = 0 366	-0 079 p = 0 651	0 064 p = 0 714
Passive control	-0 048 p = 0 784	0 058 p = 0 742	0 430 p = 0 010	0 008 p = 0 965	-0 027 p = 0 876	-0 048 p = 0 783	0 114 p = 0 516	0 396 p = 0 018	0 514 p = 0 002	0 166 p = 0 340
Future MI threat	0 055 p = 0 754	-0 322 p = 0 060	0 209 p = 0 227	0 019 p = 0 913	-0 045 p = 0 797	0 344 p = 0 043	-0 105 p = 0 549	-0 291 p = 0 090	0 175 p = 0 314	0 152 p = 0 384
Symptom perception	0 338 p = 0 047	-0 127 p = 0 466	0 124 p = 0 477	0 514 p = 0 002	0 387 p = 0 022	0 440 p = 0 008	-0 162 p = 0 351	0 082 p = 0 639	0 111 p = 0 525	0 638 p < 0 001

	Time 1									
Time 3	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	Threat	Symptom
Stress	0.752 p < 0.001	-0.095 p = 0.588	0.356 p = 0.036	0.557 p = 0.001	0.523 p = 0.001	0.447 p = 0.007	0.073 p = 0.677	-0.072 p = 0.681	0.173 p = 0.319	0.202 p = 0.246
External	-0.084 p = 0.633	0.325 p = 0.057	-0.116 p = 0.508	0.073 p = 0.678	0.173 p = 0.321	-0.234 p = 0.175	-0.055 p = 0.753	-0.052 p = 0.767	-0.191 p = 0.273	-0.304 p = 0.076
Lifestyle	0.293 p = 0.088	-0.042 p = 0.810	0.665 p < 0.001	0.297 p = 0.084	0.330 p = 0.053	0.370 p = 0.029	0.065 p = 0.712	-0.020 p = 0.909	-0.042 p = 0.813	0.224 p = 0.195
Physical	0.298 p = 0.082	0.164 p = 0.347	0.091 p = 0.603	0.488 p = 0.003	0.443 p = 0.008	0.096 p = 0.582	0.064 p = 0.714	0.130 p = 0.456	-0.169 p = 0.330	0.183 p = 0.293
Emotional	0.212 p = 0.222	0.234 p = 0.175	-0.107 p = 0.540	0.080 p = 0.646	0.497 p = 0.002	-0.196 p = 0.260	-0.103 p = 0.556	0.148 p = 0.397	-0.082 p = 0.640	0.102 p = 0.559
Time-line	-0.125 p = 0.476	-0.329 p = 0.054	0.217 p = 0.212	0.023 p = 0.894	-0.054 p = 0.759	0.317 p = 0.064	0.052 p = 0.766	-0.317 p = 0.064	-0.086 p = 0.625	0.226 p =0.193
Active control	0.305 p = 0.074	0.296 p = 0.084	-0.050 p = 0.774	0.242 p = 0.161	0.182 p = 0.296	-0.209 p = 0.227	0.439 p = 0.008	0.167 p = 0.337	-0.005 p = 0.979	0.092 p = 0.599
Passive control	0.008 p = 0.962	0.237 p = 0.170	0.150 p = 0.389	0.088 p = 0.615	-0.075 p = 0.668	-0.144 p = 0.411	-0.158 p = 0.363	0.469 p = 0.004	0.138 p = 0.429	-0.019 p = 0.913
Future MI threat	-0.004 p = 0.980	-0.307 p = 0.073	0.085 p = 0.629	-0.206 p = 0.234	-0.220 p = 0.204	0.080 p = 0.646	-0.044 p = 0.800	-0.341 p = 0.045	0.021 p = 0.903	0.003 p = 0.987
Symptom perception	0.267 p = 0.122	-0.136 p = 0.437	0.188 p = 0.280	0.264 p = 0.125	0.262 p =0.128	0.262 p = 0.128	-0.148 p = 0.395	-0.030 p = 0.865	0.198 p = 0.254	0.519 p = 0.001

	Time 2									
Time 3	Stress	External	Lifestyle	Physical	Emotional	Timeline	Active control	Passive control	Threat	Symptom
Stress	0.742 p < 0.001	-0.226 p = 0.191	0.467 p = 0.005	0.403 p = 0.016	0.402 p = 0.017	0.155 p = 0.374	0.364 p = 0.032	-0.002 p = 0.992	0.072 p = 0.682	0.402 p = 0.017
External	0.030 p = 0.865	0.711 p < 0.001	-0.130 p = 0.457	0.060 p = 0.732	0.242 p = 0.162	-0.266 p = 0.123	0.252 p = 0.144	-0.213 p = 0.219	-0.322 p = 0.059	-0.244 p = 0.158
Lifestyle	0.310 p = 0.070	-0.094 p = 0.590	0.780 p < 0.001	0.341 p = 0.045	0.351 p = 0.039	0.182 p = 0.296	0.203 p = 0.241	0.237 p = 0.170	0.043 p = 0.805	0.318 p = 0.062
Physical	0.231 p = 0.182	0.091 p = 0.605	0.346 p = 0.042	0.745 p < 0.001	0.575 p < 0.001	-0.053 p = 0.764	0.190 p = 0.275	0.134 p = 0.443	0.187 p =0.282	0.453 p = 0.006
Emotional	0.263 p = 0.127	0.055 p = 0.755	0.209 p = 0.227	0.512 p = 0.002	0.610 p < 0.001	-0.053 p = 0.762	-0.068 p = 0.697	-0.002 p = 0.992	0.028 p = 0.874	0.416 p = 0.013
Time-line	-0.199 p = 0.251	-0.228 p = 0.188	0.097 p = 0.579	0.071 p = 0.685	0.127 p = 0.467	0.630 p < 0.001	-0.298 p = 0.082	0.009 p = 0.959	0.375 p = 0.026	0.322 p = 0.060
Active control	0.367 p = 0.030	0.243 p = 0.160	-0.041 p = 0.814	0.196 p = 0.260	0.013 p = 0.940	-0.412 p = 0.014	0.695 p < 0.001	0.007 p = 0.967	-0.531 p = 0.001	-0.014 p = 0.935
Passive control	0.013 p = 0.941	0.421 p = 0.012	0.112 p = 0.522	0.323 p = 0.059	0.213 p = 0.220	-0.297 p = 0.083	-0.066 p = 0.706	0.607 p < 0.001	-0.164 p = 0.346	0.175 p = 0.314
Future MI threat	-0.140 p = 0.423	-0.146 p = 0.402	-0.140 p = 0.424	-0.122 p = 0.483	-0.064 p = 0.715	0.300 p = 0.080	-0.403 p = 0.016	-0.204 p = 0.240	0.406 p = 0.016	0.006 p = 0.972
Symptom perception	-0.002 p = 0.989	-0.191 p = 0.272	0.254 p = 0.141	0.380 p = 0.024	0.410 p = 0.015	0.210 p = 0.226	-0.115 p = 0.512	0.170 p = 0.329	0.466 p = 0.005	0.732 p < 0.001

Appendix E- 16. Correlations of the 35 MI patients' mood and illness perceptions correlation at three assessments

Patients	Time 1				Time 2					Time 3				
Acute	Depression	State anxiety	Positive affect	Negative affect	Time 2	Depression	State anxiety	Positive affect	Negative affect	Time 3	Depression	State anxiety	Positive affect	Negative affect
Stress	0.201, p = 0.247	0.003, p = 0.988	0.152, p = 0.384	0.147, p = 0.398	Stress	0.505, p = 0.002	0.474, p = 0.004	0.297, p = 0.083	0.556, p = 0.001	Stress	0.328, p = 0.055	0.506, p = 0.002	0.000, p = 0.999	0.606, p < 0.001
External	-0.028, p = 0.872	-0.095, p = 0.586	0.005, p = 0.978	-0.230, p = 0.184	External	0.101, p = 0.563	-0.006, p = 0.974	0.098, p = 0.575	0.137, p = 0.433	External	-0.082, p = 0.638	-0.037, p = 0.835	-0.177, p = 0.309	0.033, p = 0.851
Lifestyle	-0.017, p = 0.923	-0.066, p = 0.706	0.090, p = 0.607	0.239, p = 0.167	Lifestyle	0.401, p = 0.017	0.309, p = 0.071	0.061, p = 0.726	0.361, p = 0.033	Lifestyle	0.237, p = 0.170	0.191, p = 0.271	-0.102, p = 0.560	0.161, p = 0.356
Physical	0.645, p < 0.001	0.432, p = 0.010	0.090, p = 0.607	0.564, p < 0.001	Physical	0.602, p < 0.001	0.504, p = 0.002	0.167, p = 0.337	0.640, p < 0.001	Physical	0.372, p = 0.028	0.396, p = 0.018	-0.170, p = 0.330	0.382, p = 0.024
Emotional	0.444, p = 0.007	0.459, p = 0.006	0.072, p = 0.683	0.533, p = 0.001	Emotional	0.638, p < 0.001	0.485, p = 0.003	0.125, p = 0.473	0.593, p < 0.001	Emotional	0.574, p < 0.001	0.460, p = 0.005	-0.238, p = 0.169	0.425, p = 0.011
Timeline	0.325, p = 0.057	0.500, p = 0.002	-0.183, p = 0.292	0.196, p = 0.258	Timeline	0.242, p = 0.161	0.423, p = 0.011	0.158, p = 0.365	0.435, p = 0.009	Timeline	0.287, p = 0.095	0.422, p = 0.012	-0.063, p = 0.719	0.380, p = 0.024
Active control	-0.355, p = 0.036	-0.352, p = 0.038	0.216, p = 0.213	-0.120, p = 0.492	Active control	-0.051, p = 0.772	-0.040, p = 0.821	0.121, p = 0.489	-0.025, p = 0.886	Active control	-0.072, p = 0.680	-0.049, p = 0.781	0.389, p = 0.021	0.042, p = 0.811
Passive control	0.448, p = 0.007	0.324, p = 0.058	-0.237, p = 0.170	0.304, p = 0.076	Passive control	0.349, p = 0.040	0.079, p = 0.652	-0.248, p = 0.151	0.076, p = 0.665	Passive control	0.184, p = 0.289	0.091, p = 0.603	-0.224, p = 0.196	0.063, p = 0.717
Future MI threat	0.205, p = 0.238	0.417, p = 0.013	-0.041, p = 0.813	0.155, p = 0.374	Future MI threat	0.149, p = 0.394	0.012, p = 0.948	0.086, p = 0.624	0.288, p = 0.093	Future MI threat	0.475, p = 0.004	0.412, p = 0.014	-0.327, p = 0.055	0.266, p = 0.122
Symptom perception	0.616, p < 0.001	0.585, p < 0.001	-0.138, p = 0.428	0.566, p < 0.001	Symptom perception	0.605, p < 0.001	0.434, p = 0.009	-0.055, p = 0.753	0.526, p = 0.001	Symptom perception	0.503, p = 0.002	0.351, p = 0.039	-0.494, p = 0.003	0.239, p = 0.166
Cognitive difference in -					**Cognitive difference in -**					**Cognitive difference in -**				
Stress	0.141, p = 0.419	0.110, p = 0.528	-0.135, p = 0.441	0.114, p = 0.515	Stress	0.492, p = 0.003	0.477, p = 0.004	-0.044, p = 0.803	0.559, p < 0.001	Stress	-0.095, p = 0.586	0.148, p = 0.397	-0.283, p = 0.100	0.281, p = 0.103
External	0.152, p = 0.383	0.097, p = 0.580	-0.113, p = 0.519	0.024, p = 0.890	External	0.261, p = 0.131	0.325, p = 0.057	0.087, p = 0.619	0.185, p = 0.288	External	-0.043, p = 0.807	-0.140, p = 0.422	0.011, p = 0.948	-0.165, p = 0.343
Lifestyle	-0.152, p = 0.382	-0.067, p = 0.701	0.186, p = 0.284	0.179, p = 0.304	Lifestyle	0.100, p = 0.566	0.221, p = 0.202	-0.034, p = 0.845	0.121, p = 0.488	Lifestyle	-0.089, p = 0.695	0.009, p = 0.959	-0.116, p = 0.508	0.032, p = 0.856
Physical	0.343, p = 0.044	0.206, p = 0.236	-0.245, p = 0.157	0.280, p = 0.104	Physical	0.213, p = 0.220	0.331, p = 0.052	0.265, p = 0.124	0.358, p = 0.035	Physical	0.209, p = 0.228	0.183, p = 0.294	-0.047, p = 0.787	0.272, p = 0.114
Emotional	0.117, p = 0.504	0.311, p = 0.069	-0.126, p = 0.471	0.183, p = 0.349	Emotional	0.280, p = 0.104	0.387, p = 0.022	0.097, p = 0.581	0.385, p = 0.022	Emotional	0.459, p = 0.006	0.371, p = 0.028	0.089, p = 0.612	0.147, p = 0.398
Timeline	0.179, p = 0.303	0.105, p = 0.549	-0.351, p = 0.038	-0.055, p = 0.754	Timeline	0.007, p = 0.970	0.200, p = 0.248	0.128, p = 463	0.083, p = 0.635	Timeline	0.122, p = 0.484	0.135, p = 0.440	-0.016, p = 0.927	0.195, p = 0.262
Active control	-0.179, p = 0.304	0.004, p = 0.983	0.053, p = 0.762	-0.174, p = 0.318	Active control	-0.037, p = 0.831	0.073, p = 0.677	-0.018, p = 0.919	0.006, p = 0.972	Active control	0.114, p = 0.515	-0.083, p = 0.637	-0.027, p = 0.879	-0.186, p = 0.286
Passive control	0.455, p = 0.006	0.424, p = 0.011	-0.112, p = 0.523	0.452, p = 0.006	Passive control	0.100, p = 0.569	-0.046, p = 0.793	-0.195, p = 0.262	-0.131, p = 0.453	Passive control	0.092, p = 0.601	0.154, p = 0.376	-0.238, p = 0.168	0.015, p = 0.932
Future MI threat	-0.080, p = 0.646	0.177, p = 0.308	0.145, p = 0.405	0.069, p = 0.695	Future MI threat	-0.047, p = 0.788	-0.149, p = 0.392	0.326, p = 0.056	0.164, p = 0.347	Future MI threat	0.390, p = 0.021	0.260, p = 0.132	-0.057, p = 0.748	0.328, p = 0.054
Symptom perception	0.011, p = 0.952	0.191, p = 0.271	-0.262, p = 0.129	0.268, p = 0.120	Symptom perception	0.168, p = 0.334	0.268, p = 0.120	-0.043, p = 0.805	0.129, p = 0.459	Symptom perception	0.052, p = 0.766	0.097, p = 0.579	-0.255, p = 0.140	0.154, p = 0.378

Appendix E- 17. Correlations of the 35 MI spouses' moods and illness perceptions at three assessments

Spouses	Time 1				Time 2					Time 3				
Acute	Depression	State anxiety	Positive affect	Negative affect	Time 2	Depression	State anxiety	Positive affect	Negative affect	Time 3	Depression	State anxiety	Positive affect	Negative affect
Stress	0.497, p = 0.002	0.450, p = 0.007	-0.026, p = 0.882	0.420, p = 0.012	Stress	0.419, p = 0.012	0.419, p = 0.012	0.026, p = 0.880	0.453, p = 0.006	Stress	0.305, p = 0.075	0.180, p = 0.300	0.264, p = 0.125	0.201, p = 0.247
External	0.325, p = 0.057	0.441, p = 0.008	-0.359, p = 0.034	0.321, p = 0.060	External	0.121, p = 0.490	0.117, p = 0.504	-0.066, p = 0.707	0.140, p = 0.423	External	0.070, p = 0.691	-0.034, p = 0.847	-0.097, p = 0.581	0.079, p = 0.652
Lifestyle	0.043, p = 0.806	0.045, p = 0.797	-0.094, p = 0.590	0.165, p = 0.344	Lifestyle	0.279, p = 0.104	0.153, p = 0.380	-0.050, p = 0.777	0.201, p = 0.247	Lifestyle	0.300, p = 0.080	0.158, p = 0.364	0.018, p = 0.917	0.294, p = 0.087
Physical	0.555, p = 0.001	0.208, p = 0.230	0.066, p = 0.705	0.367, p = 0.030	Physical	0.437, p = 0.009	0.155, p 0.375	0.332, p = 0.052	0.345, p = 0.042	Physical	0.420, p = 0.012	0.231, p = 0.182	0.076, p = 0.662	0.482, p = 0.003
Emotional	0.773, p < 0.001	0.584, p < 0.001	-0.138, p = 0.429	0.725, p < 0.014	Emotional	0.701, p < 0.001	0.620, p < 0.001	0.028, p = 0.871	0.689, p < 0.001	Emotional	0.497, p = 0.025	0.574, p < 0.001	-0.056, p = 0.751	0.572, p < 0.001
Timeline	0.040, p = 0.821	-0.297, p = 0.083	0.151, p = 0.387	-0.100, p = 0.567	Timeline	0.020, p = 0.909	0.134, p = 0.442	-0.053, p = 0.764	-0.174, p = 0.317	Timeline	-0.046, p = 0.795	-0.071, p = 0.684	0.190, p = 0.274	-0.004, p = 0.984
Active control	0.047, p = 0.790	0.019, p = 0.916	0.250, p = 0.148	0.414, p = 0.013	Active control	0.053, p = 0.762	0.035, p = 0.840	0.259, p = 0.134	0.248, p = 0.151	Active control	-0.128, p = 0.464	-0.078, p = 0.656	0.280, p = 0.103	-0.022, p = 0.902
Passive control	0.338, p = 0.047	0.224, p = 0.196	-0.256, p = 0.138	0.239, p = 0.167	Passive control	0.009, p = 0.958	-0.030, p = 0.863	-0.027, p = 0.876	-0.128, p = 0.464	Passive control	0.125, p = 0.474	-0.007, p = 0.970	-0.269, p = 0.118	0.088, p = 0.617
Future MI threat	-0.347, p = 0.041	-0.059, p = 0.735	0.015, p = 0.932	-0.327, p = 0.055	Future MI threat	0.056, p = 0.748	0.039, p = 0.825	-0.006, p = 0.974	-0.047, p = 0.790	Future MI threat	0.192, p = 0.269	0.251, p = 0.146	-0.210, p = 0.225	0.117, p = 0.502
Symptom perception	0.052, p = 0.766	-0.092, p = 0.600	0.192, p = 0.270	0.026, p = 0.883	Symptom perception	0.282, p = 0.100	0.244, p = 0.158	0.117, p = 0.505	0.095, p = 0.586	Symptom perception	0.439, p = 0.008	0.360, p = 0.033	-0.081, p = 0.642	0.334, p = 0.050
Cognition difference in -					**Cognition difference in -**					**Cognition difference in -**				
Stress	-0.015, p = 0.934	-0.101, p = 0.566	-0.095, p = 0.586	-0.073, p = 0.677	Stress	0.012, p = 0.946	0.109, p = 0.534	0.043, p = 0.806	-0.068, p = 0.700	Stress	-0.286, p = 0.096	-0.238, p = 0.169	-0.091, p = 0.604	-0.206, p = 0.236
External	-0.363, p = 0.032	-0.253, p = 0.142	0.277, p = 0.107	-0.352, p = 0.038	External	0.231, p = 0.183	0.292, p = 0.089	-0.386, p = 0.022	0.004, p = 0.983	External	0.132, p = 0.449	0.010, p = 0.957	-0.153, p = 0.380	0.035, p = 0.844
Lifestyle	0.272, p = 0.114	0.145, p = 0.405	-0.082, p = 0.638	0.177, p = 0.310	Lifestyle	0.048, p = 0.793	0.130, p = 0.458	-0.133, p = 0.447	-0.011, p = 0.948	Lifestyle	-0.160, p = 0.358	0.050, p = 0.774	-0.200, p = 0.250	-0.152, p = 0.385
Physical	-0.302, p = 0.078	0.017, p = 0.922	-0.055, p = 0.754	-0.105, p = 0.550	Physical	-0.153, p = 0.380	0.119, p = 0.496	-0.177, p = 0.310	-0.165, p = 0.344	Physical	-0.127, p = 0.468	0.069, p = 0.693	-0.322, p = 0.059	-0.119, p = 0.494
Emotional	-0.546, p = 0.001	-0.430, p = 0.010	0.207, p = 0.233	-0.514, p = 0.002	Emotional	-0.388, p = 0.021	-0.244, p = 0.157	0.155, p = 0.375	-0.407, p = 0.015	Emotional	-0.134, p = 0.442	-0.272, p = 0.114	-0.119, p = 0.497	-0.201, p = 0.247
Timeline	-0.145, p = 0.405	0.018, p = 0.919	-0.155, p = 0.374	-0.144, p = 0.408	Timeline	0.074, p = 0.672	0.076, p = 0.665	0.188, p = 0.279	0.267, p = 0.121	Timeline	-0.090, p = 0.609	-0.072, p = 0.683	0.042, p = 0.811	-0.123, p = 0.480
Active control	0.046, p = 0.792	-0.032, p = 0.855	-0.301, p = 0.079	-0.243, p = 0.159	Active control	-0.058, p = 0.740	-0.069, p = 0.696	-0.353, p = 0.038	-0.238, p = 0.169	Active control	-0.003, p = 0.987	-0.116, p = 0.508	0.055, p = 0.753	-0.024, p = 0.891
Passive control	-0.270, p = 0.117	-0.001, p = 0.997	0.048, p = 0.784	-0.211, p = 0.224	Passive control	0.283, p = 0.100	0.314, p = 0.066	-0.177, p = 0.310	0.269, p = 0.118	Passive control	0.022, p = 0.901	0.156, p = 0.370	-0.220, p = 0.205	0.001, p = 0.995
Future MI threat	0.063, p = 0.720	-0.152, p = 0.384	-0.070, p = 0.689	0.001, p = 0.994	Future MI threat	-0.076, p = 0.664	0.108, p = 0.537	-0.100, p = 0.566	0.062, p = 0.723	Future MI threat	-0.025, p = 0.885	-0.084, p = 0.630	-0.053, p = 0.763	-0.056, p = 0.750
Symptom perception	-0.228, p = 0.187	-0.139, p = 0.427	0.036, p = 0.836	-0.248, p = 0.150	Symptom perception	-0.241, p = 0.163	-0.257, p = 0.136	0.138, p = 0.429	-0.104, p = 0.551	Symptom perception	-0.294, p = 0.086	-0.124, p = 0.476	-0.172, p = 0.323	-0.140, p = 0.424

Appendix E- 18. The full correlation table between the 35 MI couples' individual moods and combined illness perceptions at three assessments

Patients	Time 1				Time 2					Time 3				
Acute	Depression	State anxiety	Positive affect	Negative affect	Time 2	Depression	State anxiety	Positive affect	Negative affect	Time 3	Depression	State anxiety	Positive affect	Negative affect
Stress	0.147, p = 0.395	-0.052, p = 0.766	0.231, p = 0.181	0.103, p = 0.557	Stress	0.367, p = 0.030	0.337, p = 0.048	0.395, p = 0.019	0.396, p = 0.019	Stress	0.416, p = 0.013	**0.449, p = 0.007**	0.186, p = 0.285	**0.470, p = 0.004**
External	-0.116, p = 0.506	-0.164, p = 0.348	0.068, p = 0.700	-0.279, p = 0.105	External	-0.031, p = 0.859	-0.196, p = 0.260	0.066, p = 0.706	0.055, p = 0.752	External	-0.070, p = 0.691	0.062, p = 0.722	-0.229, p = 0.186	0.168, p = 0.335
Lifestyle	0.049, p = 0.779	-0.039, p = 0.823	0.012, p = 0.944	0.170, p = 0.328	Lifestyle	0.407, p = 0.015	0.210, p = 0.227	0.098, p = 0.574	0.344, p = 0.043	Lifestyle	0.287, p = 0.095	0.199, p = 0.252	-0.050, p = 0.773	0.155, p = 0.373
Physical	**0.485, p = 0.003**	0.340, p = 0.048	0.251, p = 0.146	**0.436, p = 0.009**	Physical	**0.593, p < 0.001**	0.392, p = 0.020	0.023, p = 0.895	**0.539, p = 0.0014**	Physical	0.310, p = 0.070	0.359, p = 0.034	-0.176, p = 0.312	0.277, p = 0.107
Timeline	0.235, p = 0.173	**0.495, p = 0.003**	0.061, p = 0.728	0.269, p = 0.118	Timeline	0.315, p = 0.065	0.415, p = 0.013	0.117, p = 0.503	**0.515, p = 0.002**	Timeline	0.299, p = 0.081	**0.479, p = 0.004**	-0.075, p = 0.667	0.368, p = 0.030
Active control	-0.226, p = 0.192	-0.322, p = 0.059	0.167, p = 0.336	-0.015, p = 0.933	Active control	-0.039, p = 0.825	-0.124, p = 0.477	0.190, p = 0.273	-0.042, p = 0.812	Active control	-0.156, p = 0.371	0.018, p = 0.920	0.388, p = 0.021	0.183, p = 0.294
Passive control	0.256, p = 0.137	0.102, p = 0.559	-0.249, p = 0.149	0.048, p = 0.785	Passive control	0.370, p = 0.029	0.135, p = 0.440	-0.171, p = 0.326	0.194, p = 0.264	Passive control	0.179, p = 0.305	0.020, p = 0.911	-0.137, p = 0.434	0.072, p = 0.681
Future MI threat	0.351, p = 0.039	0.426, p = 0.011	-0.180, p = 0.302	0.156, p = 0.371	Future MI threat	0.221, p = 0.203	0.146, p = 0.402	-0.186, p = 0.286	0.201, p = 0.247	Future MI threat	0.188, p = 0.278	0.226, p = 0.191	-0.298, p = 0.082	0.019, p = 0.914
Symptom perception	**0.646, p < 0.001**	**0.526, p = 0.001**	-0.019, p = 0.915	**0.468, p = 0.005**	Symptom perception	**0.665, p < 0.001**	0.412, p = 0.014	-0.048, p = 0.783	**0.585, p < 0.001**	Symptom perception	**0.542, p = 0.001**	0.348, p = 0.040	**-0.430, p = 0.010**	0.193, p = 0.266
Spouses														
Acute	Depression	State anxiety	Positive affect	Negative affect	Time 2	Depression	State anxiety	Positive affect	Negative affect	Time 3	Depression	State anxiety	Positive affect	Negative affect
Stress	**0.585, p < 0.001**	**0.467, p = 0.005**	-0.077, p = 0.658	**0.446, p = 0.007**	Stress	**0.426, p = 0.010**	**0.480, p = 0.004**	0.050, p = 0.777	0.420, p = 0.012	Stress	0.209, p = 0.228	0.079, p = 0.653	0.285, p = 0.097	0.127, p = 0.467
External	0.166, p = 0.341	0.358, p = 0.035	-0.252, p = 0.145	0.168, p = 0.336	External	0.269, p = 0.117	0.301, p = 0.079	-0.298, p = 0.082	0.159, p = 0.361	External	0.191, p = 0.272	-0.036, p = 0.838	-0.241, p = 0.162	0.128, p = 0.465
Lifestyle	0.168, p = 0.334	0.115, p = 0.510	-0.144, p = 0.411	0.266, p = 0.123	Lifestyle	0.388, p = 0.021	0.288, p = 0.093	-0.159, p = 0.361	0.247, p = 0.152	Lifestyle	0.270, p = 0.116	0.210, p = 0.226	-0.079, p = 0.654	0.268, p = 0.120
Physical	**0.515, p = 0.002**	0.275, p = 0.110	0.050, p = 0.776	0.400, p = 0.017	Physical	0.418, p = 0.012	0.267, p = 0.121	0.276, p = 0.108	0.300, p = 0.080	Physical	0.424, p = 0.011	0.332, p = 0.051	-0.137, p = 0.432	**0.505, p = 0.002**
Timeline	-0.058, p = 0.741	-0.393, p = 0.019	0.086, p = 0.622	-0.249, p = 0.149	Timeline	0.075, p = 0.667	0.206, p = 0.236	0.075, p = 0.669	-0.006, p = 0.972	Timeline	-0.133, p = 0.446	-0.149, p = 0.393	**0.369, p = 0.118**	-0.111, p = 0.526
Active control	0.087, p = 0.619	0.007, p = 0.967	0.168, p = 0.335	0.417, p = 0.013	Active control	0.014, p = 0.937	-0.018, p = 0.919	0.005, p = 0.979	0.097, p = 0.579	Active control	-0.196, p = 0.259	-0.208, p = 0.232	**0.468, p = 0.005**	-0.051, p = 0.770
Passive control	0.162, p = 0.352	0.264, p = 0.125	-0.260, p = 0.131	0.097, p = 0.580	Passive control	0.221, p = 0.2014	0.197, p = 0.257	-0.165, p = 0.344	0.044, p = 0.801	Passive control	0.148, p = 0.397	0.091, p = 0.602	-0.427, p = 0.011	0.095, p = 0.589
Future MI threat	-0.374, p = 0.027	-0.201, p = 0.247	-0.041, p = 0.816	-0.402, p = 0.017	Future MI threat	0.014, p = 0.934	0.152, p = 0.383	-0.096, p = 0.577	-0.013, p = 0.941	Future MI threat	0.262, p = 0.128	0.301, p = 0.079	-0.351, p = 0.039	0.128, p = 0.463
Symptom perception	-0.050, p = 0.774	-0.174, p = 0.316	0.241, p = 0.163	-0.091, p = 0.603	Symptom perception	0.161, p = 0.354	0.117, p = 0.502	0.172, p = 0.324	0.044, p = 0.801	Symptom perception	0.338, p = 0.047	0.337, p = 0.048	-0.176, p = 0.311	0.299, p = 0.081

Appendix E- 19. Correlations between the 35 couples' moods and social support at the second and third assessment

	Patients' moods at 4-8 weeks post-MI				Patients' moods at 6-month post-MI				
Support at 4-8 weeks post-MI	Depression	State anxiety	Positive affect	Negative affect	Support at 6-month post-MI	Depression	State anxiety	Positive affect	Negative affect
Total support	-0.406, p = 0.016	-0.304, p = 0.076	0.082, p = 0.638	-0.418, p = 0.012	Total support	-0.102, p = 0.559	-0.171, p = 0.325	-0.118, p = 0.499	-0.181, p = 0.299
Special one's support	-0.114, p = 0.515	0.061, p = 0.729	-0.055, p = 0.755	-0.141, p = 0.420	Special one's support	-0.170, p = 0.330	-0.225, p = 0.194	0.020, p = 0.909	-0.102, p = 0.560
Family's support	-0.388, p = 0.021	-0.299, p = 0.081	0.043, p = 0.805	-0.349, p = 0.040	Family's support	0.000, p = 0.999	-0.080, p = 0.648	-0.200, p = 0.250	-0.061, p = 0.729
Friends' support	-0.300, p = 0.080	-0.289, p = 0.092	0.140, p = 0.422	-0.355, p = 0.036	Friends' support	-0.092, p = 0.598	-0.120, p = 0.492	-0.067, p = 0.701	-0.242, p = 0.161
Perceived support	-0.152, p = 0.383	0.138, p = 0.428	0.235, p = 0.175	-0.056, p = 0.750	Perceived support	-0.008, p = 0.963	0.024, p = 0.893	-0.002, p = 0.990	0.226, p = 0.192
Desired support	0.191, p = 0.272	0.214, p = 0.216	0.115, p = 0.512	0.214, p = 0.217	Desired support	0.030, p = 0.862	0.191, p = 0.271	-0.196, p = 0.259	0.132, p = 0.451
Perceived minus desired support	-0.296, p = 0.084	-0.085, p = 0.627	0.083, p = 0.635	-0.240, p = 0.165	Perceived minus desired support	-0.035, p = 0.843	-0.139, p = 0.427	0.166, p = 0.342	0.131, p = 0.455
Marital satisfaction	-0.150, p = 0.391	0.017, p =0.921	0.084, p = 0.632	-0.151, p = 0.385					
	Spouses' moods at 4-8 weeks post-MI					Spouses' moods at 6-month post-MI			
Support at 4-8 weeks post-MI	Depression	State anxiety	Positive affect	Negative affect	Support at 6-month post-MI	Depression	State anxiety	Positive affect	Negative affect
Total support	-0.017, p = 0.921	-0.047, p = 0.790	0.466, p = 0.005	0.077, p = 0.660	Total support	-0.268, p = 0.120	-0.115, p = 0.511	0.168, p = 0.334	-0.089, p = 0.610
Special one's support	-0.076, p = 0.666	-0.045, p = 0.799	0.451, p = 0.007	0.055, p = 0.756	Special one's support	-0.206, p = 0.236	-0.079, p = 0.653	0.098, p = 0.574	-0.134, p = 0.444
Family's support	0.084, p = 0.631	0.076, p = 0.664	0.356, p = 0.036	0.201, p = 0.248	Family's support	-0.309, p = 0.071	-0.143, p = 0.412	0.198, p = 0.253	-0.110, p = 0.528
Friends' support	-0.026, p = 0.883	-0.114, p = 0.513	0.280, p = 0.104	-0.042, p = 0.809	Friends' support	-0.160, p = 0.359	-0.069, p = 0.693	0.131, p = 0.454	0.025, p = 0.887
Perceived support	0.025, p = 0.887	-0.083, p = 0.637	0.128, p = 0.462	-0.036, p = 0.838	Perceived support	-0.184, p = 0.290	-0.188, p = 0.279	0.376, p = 0.026	-0.089, p = 0.610
Desired support	0.149, p = 0.392	-0.058, p = 0.741	0.394, p = 0.019	0.133, p = 0.446	Desired support	0.253, p = 0.143	0.230, p = 0.185	0.017, p = 0.922	0.228, p = 0.187
Perceived minus desired support	-0.086, p = 0.623	-0.035, p = 0.841	-0.168, p = 0.334	-0.131, p =0.452	Perceived minus desired support	-0.315, p = 0.065	-0.303, p = 0.077	0.284, p = 0.098	-0.224, p = 0.195

Appendix E- 20. Correlations between the 35 MI couples' moods and coping at the second and third assessment

	Time 2: Patients' moods at 4-8 weeks post-MI			
Patients' coping at time 2	Depression	State anxiety	Positive affect	Negative affect
Active coping	-0.276, p =0.108	-0.218, p = 0.207	0.369, p = 0.029	-0.067, p = 0.703
Denial	0.225, p = 0.194	0.196, p = 0.259	-0.281, p = 0.102	0.336, p = 0.049
Substance abuse	0.103, p = 0.556	0.193,, p = 0.267	-0.094, p = 0.590	-0.121, p = 0.490
Accepting emotional support	0.346, p = 0.041	0.310, p = 0.070	-0.025, p = 0.885	0.362, p = 0.032
Behavioural disengagement	0.368, p = 0.030	0.308, p = 0.071	0.005, p = 0.976	0.413, p = 0.014
Positive reframing	-0.237, p = 0.171	-0.018, p = 0.920	0.363, p = 0.032	0.144, p = 0.411
Self-distraction	0.223, p = 0.198	0.152, p = 0.382	-0.017, p = 0.921	0.169, p = 0.332
Venting	0.311, p = 0.069	0.061, p = 0.726	-0.168, p = 0.336	0.165, p = 0.344
Accepting instrumental support	0.154, p = 0.378	-0.007, p = 0.966	0.074, p = 0.672	0.177, p = 0.308
Acceptance	-0.058, p = 0.739	-0.044, p = 0.801	0.338, p = 0.047	0.099, p = 0.573
Self-blame	0.437, p = 0.009	0.241, p = 0.164	-0.014, p = 0.935	0.256, p = 0.137
Religion	0.130, p = 0.456	-0.091, p = 0.604	-0.220, p = 0.204	0.170, p = 0.328
Humour	0.110, p = 0.531	0.191, p = 0.272	0.329, p = 0.053	0.242, p = 0.161
Planning	0.081, p = 0.643	0.328, p = 0.055	0.019, p = 0.913	0.290, p = 0.092
Spouses' coping t time 2				
Substance abuse	-0.171, p = 0.325	-0.293, p = 0.087	**0.510, p = 0.002**	-0.180, p = 0.301
Humour	0.287, p = 0.095	**0.545, p = 0.001**	0.061, p = 0.727	0.133, p = 0.447

	Time 3: Patients' moods at 6-month post-MI			
Patients' coping at time 3	Depression	State anxiety	Positive affect	Negative affect
Active coping	-0.180, p = 0.300	-0.149, p = 0.393	0.353, p = 0.038	0.020, p = 0.910
Denial	0.248, p = 0.152	0.145, p = 0.406	-0.402, p = 0.017	0.347, p = 0.041
Substance abuse	-0.090, p = 0.608	-0.204, p = 0.240	0.077, p = 0.661	-0.185, p = 0.288
Accepting emotional support	0.075, p = 0.669	-0.025, p = 0.887	-0.228, p = 0.188	0.105, p = 0.547
Behavioural disengagement	0.344, p = 0.043	0.271, p = 0.115	-0.270, p = 0.117	0.247, p = 0.153
Positive reframing	0.065, p = 0.710	0.179, p = 0.303	0.037, p = 0.833	0.179, p = 0.303
Self-distraction	0.269, p = 0.118	0.206, p = 0.236	-0.094, p = 0.591	0.368, p = 0.030
Venting	0.473, p = 0.004	0.328, p = 0.054	-0.163, p = 0.349	0.359, p = 0.034
Accepting instrumental support	0.188, p = 0.278	0.115, p = 0.512	-0.162, p = 0.353	0.339, p = 0.047
Acceptance	-0.048, p = 0.784	-0.073, p = 0.679	0.418, p = 0.013	-0.124, p = 0.477
Self-blame	0.499, p = 0.002	0.503, p = 0.002	-0.005, p = 0.978	0.508, p = 0.002
Religion	0.129, p = 0.462	0.073, p = 0.675	-0.207, p = 0.233	0.147, p = 0.399
Humour	0.152, p = 0.382	0.269, p = 0.118	0.009, p = 0.959	0.060, p = 0.732
Planning	0.295, p = 0.086	0.232, p = 0.181	0.131, p = 0.454	0.276, p = 0.109

	Time 2: Spouses' moods at 4-8 weeks post-MI			
Spouses' coping at time 2	Depression	State anxiety	Positive affect	Negative affect
Active coping	0.312, p = 0.068	0.097, p = 0.578	0.556, p = 0.001	0.248, p = 0.151
Denial	0.653, p < 0.001	0.538, p = 0.001	0.004, p = 0.980	0.694, p < 0.001
Substance abuse	0.445, p = 0.007	0.381, p = 0.024	-0.331, p = 0.052	0.343, p = 0.044
Accepting emotional support	0.283, p = 0.100	0.141, p = 0.418	0.103, p = 0.554	0.219, p = 0.205
Behavioural disengagement	0.542, p = 0.001	0.365, p = 0.031	-0.035, p = 0.843	0.425, p = 0.011
Positive reframing	0.384, p = 0.023	0.217, p = 0.210	0.310, p = 0.070	0.327, p = 0.055
Self-distraction	0.378, p = 0.025	0.198, p = 0.255	0.122, p = 0.486	0.275, p = 0.109
Venting	0.154, p = 0.376	0.154, p = 0.376	0.217, p = 0.212	0.098, p = 0.576
Accepting instrumental support	0.174, p = 0.317	-0.009, p = 0.961	0.477, p = 0.004	0.099, p = 0.571
Acceptance	0.074, p = 0.671	-0.014, p = 0.935	0.604, p < 0.001	0.218, p = 0.208
Self-blame	0.636, p < 0.001	0.463, p = 0.005	-0.159, p = 0.362	0.643, p < 0.001
Religion	0.315, p = 0.066	0.086, p = 0.622	0.331, p = 0.052	0.298, p = 0.082
Humour	0.154, p = 0.376	-0.095, p = 0.587	0.380, p = 0.024	0.030, p = 0.865
Planning	0.444, p = 0.008	0.474, p = 0.004	0.163, p = 0.349	0.492, p = 0.003
Patients' coping at time 2				
Accepting instrumental support	**0.435, p = 0.009**	0.352, p = 0.038	-0.018, p = 0.919	**0.444, p = 0.008**
Accepting emotional support				
Self-distraction				

	Time 3: Spouses' moods at 6-month post-MI			
Spouses' coping at time 3	Depression	State anxiety	Positive affect	Negative affect
Active coping	0.352, p = 0.038	0.194, p = 0.265	0.095, p = 0.587	0.297, p = 0.083
Denial	0.453, p = 0.006	0.235, p = 0.174	-0.108, p = 0.538	0.414, p =0.013
Substance abuse	0.165, p = 0.344	0.339, p = 0.046	-0.145, p = 0.405	0.134, p = 0.442
Accepting emotional support	0.332, p = 0.052	0.376, p = 0.026	0.036, p = 0.837	0.318, p = 0.063
Behavioural disengagement	0.391, p = 0.020	0.163, p = 0.350	-0.216, p = 0.212	0.281, p = 0.102
Positive reframing	-0.082, p = 0.638	-0.132, p = 0.448	0.551, p = 0.001	0.045, p = 0.799
Self-distraction	0.684, p < 0.001	0.634, p < 0.001	-0.073, p = 0.675	0.638, p < 0.001
Venting	0.593, p < 0.001	0.495, p = 0.003	-0.019, p = 0.915	0.618, p < 0.001
Accepting instrumental support	0.298, p = 0.082	0.192, p = 0.269	0.029, p = 0.869	0.406, p = 0.016
Acceptance	-0.029, p = 0.870	-0.058, p = 0.741	0.294, p = 0.086	0.054, p = 0.759
Self-blame	0.507, p = 0.002	0.423, p = 0.011	-0.164, p = 0.346	0.430, p = 0.010
Religion	0.349, p = 0.040	0.240, p = 0.165	0.018, p = 0.918	0.402, p = 0.017
Humour	-0.093, p = 0.595	-0.039, p = 0.825	0.142, p = 0.416	-0.145, p = 0.407
Planning	0.304, p = 0.076	0.169, p = 0.331	0.111, p = 0.526	0.291, p = 0.090
Patients' coping at time 3				
Accepting emotional support	0.236, p = 0.173	**0.449, p = 0.007**	0.077, p = 0.662	0.365, p = 0.031
Self-distraction	0.347, p = 0.041	**0.509, p = 0.002**	-0.147, p = 0.398	0.363, p = 0.032

Appendix E- 21. Comparisons of in-hospital moods between 3 couple groups (based on in-hospital illness perception median split)

Couples' illness perception similarity in –	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	**Spouse' moods mean (SD)**	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI; p)
Causal component 1: stress	Depression	12.73 (7.16) (n = 11)	15.20 (10.13) (n = 10)	17.07 (10.85) (n = 14)	$F_{(2, 32)} = 0.627$, p = 0.540	Causal component 1: stress	depression	18.82 (13.47) (n = 11)	20.00 (10.84) (n = 10)	34.43 (9.32) (n = 14)	**$F_{(2, 32)} = 7.635$, p = 0.002 G2 – G1 = 14.429 (0.29 – 28.57), p = 0.009**
	State anxiety	33.64 (10.05)	31.33 (10.56)	34.52 (14.36)	$F_{(2, 32)} = 0.207$, p = 0.814		State anxiety	41.21 (11.08)	41.33 (14.76)	61.67 (17.63)	**$F_{(2, 32)} = 7.737$, p = 0.002 G2 – G0 = 20.45 (1.73 – 39.18), p = 0.005,**
	Positive affect	26.55 (7.79)	27.80 (7.18)	29.14 (8.09)	$F_{(2, 32)} = 0.349$, p = 0.708		Positive affect	27.27 (5.88)	32.80 (10.88)	28.93 (6.49)	$F_{(2, 32)} = 1.373$, p = 0.268
	Negative affect	18.36 (6.04)	20.50 (13.41)	21.07 (9.43)	$F_{(2, 32)} = 0.244$, p = 0.785		Negative affect	24.00 (9.64)	25.90 (6.08)	31.86 (8.57)	$F_{(2, 32)} = 3.064$, p = 0.061
Causal component 2: External causes	Depression	18.17 (11.81) (n = 12)	15.13 (6.33) (n = 8)	12.80 (8.76) (n = 15)	$F_{(2, 32)} = 1.064$, p = 0.357	Causal component 2: External causes	depression	20.75 (12.56)((n = 12)	29.38 (10.30) (n = 8)	27.00 (14.66) (n = 15)	$F_{(2, 32)} = 1.237$, p = 0.304
	State anxiety	37.22 (15.62)	35.83 (8.86)	28.89 (8.42)	$F_{(2, 32)} = 1.997$, p = 0.152		State anxiety	41.11 (15.66)	46.25 (18.47)	57.78 (16.22)	$F_{(2, 32)} = 3.572$, p = 0.040
	Positive affect	26.33 (8.04)	26.13 (6.13)	30.20 (7.81)	$F_{(2, 32)} = 1.172$, p = 0.323		Positive affect	32.08 (6.22)	30.13 (8.31)	27.13 (8.67)	$F_{(2, 32)} = 1.365$, p = 0.270
	Negative affect	23.42 (12.57)	22.00 (6.61)	16.33 (7.40)	$F_{(2, 32)} = 2.126$, p = 0.136		Negative affect	24.08 (7.67)	30.38 (8.59)	29.13 (9.40)	$F_{(2, 32)} = 1.634$, p = 0.211
Causal component 3: Unhealthy lifestyles	Depression	14.08 (10.77) (n = 12)	16.57 (8.34) (n = 7)	15.38 (9.52) (n = 16)	$F_{(2, 32)} = 0.150$, p = 0.861	Causal component 3: Unhealthy lifestyles	Depression	21.17 (13.99) (n = 12)	29.71 (11.01) (n = 7)	26.69 (13.29) (n = 16)	$F_{(2, 32)} = 1.074$, p = 0.354
	State anxiety	36.11 (12.86)	31.43 (10.69)	32.08 (11.86)	$F_{(2, 32)} = 0.496$, p = 0.614		State anxiety	42.78 (15.94)	58.57 (19.80)	50.42 (17.21)	$F_{(2, 32)} = 1.888$, p = 0.168
	Positive affect	28.00 (5.31)	27.57 (7.68)	28.06 (9.30)	$F_{(2, 32)} = 0.010$, p = 0.990		Positive affect	31.00 (5.97)	28.29 (8.66)	28.94 (9.10)	$F_{(2, 32)} = 0.325$, p = 0.725
	Negative affect	17.75 (7.40)	22.29 (7.16)	20.81 (12.02)	$F_{(2, 32)} = 0.560$, p = 0.577		Negative affect	22.75 (8.54)	30.29 (6.10)	30.25 (8.84)	$F_{(2, 32)} = 3.237$, p = 0.052
Consequence component 1: Physical consequences	Depression	11.00 (3.74) (n = 6)	14.39 (10.29) (n = 18)	18.73 (9.78) (n = 11)	$F_{(2, 32)} = 1.441$, p = 0.252	Consequence component 1: Physical consequences	Depression	10.67 (6.12) (n = 6)	23.28 (11.80) (n = 18)	36.91 (7.18) (n =- 11)	**$F_{(2, 32)} = 14.805$, p < 0.001 G2 – G0 = 26.24 (14.44 – 38.05), p < 0.001 G2 – G1 = 13.63 (2.43 – 24.83), p = 0.002 G1 – G0 = 12.61 (0.10 – 25.12), p = 0.009**
	State anxiety	26.67 (6.67)	35.00 (13.10)	34.24 (11.36)	$F_{(2, 32)} = 1.177$, p = 0.321		State anxiety	38.89 (15.44)	44.81 (15.81)	62.73 (15.12)	**$F_{(2, 32)} = 6.202$, p = 0.005 No significant post hoc**
	Positive affect	20.50 (5.01)	28.72 (7.20)	30.73 (7.25)	$F_{(2, 32)} = 4.472$, p = 0.019		Positive affect	31.00 (6.84)	28.89 (9.00)	29.73 (7.03)	$F_{(2, 32)} = 0.158$, p = 0.855
	Negative affect	12.83 (1.72)	20.11 (10.78)	23.91 (8.48)	$F_{(2, 32)} = 2.813$, p = 0.075		Negative affect	18.50 (5.54)	26.94 (7.44)	33.91 (7.79)	**$F_{(2, 32)} = 8.861$, p = 0.001 G2 – G0 = 15.41 (4.07 – 26.75), p = 0.001**

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

(continued)

Couples' illness perception similarity in -	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI, p
Timeline	Depression	11.40 (8.14) (n = 5)	14.28 (7.66) (n = 18)	18.08 (12.18) (n = 12)	$F_{(2, 32)} = 1.035$, p = 0.367	Timeline	depression	25.40 (18.69) (n = 5)	28.33 (11.84) (n = 18)	21.00 (12.59) (n = 12)	$F_{(2, 32)} = 1.122$, p = 0.338
	State anxiety	24.67 (5.06)	31.85 (8.80)	39.17 (15.12)	$F_{(2, 32)} = 3.350$, p = 0.048		State anxiety	60.00 (17.48)	52.59 (15.28)	40.28 (18.56)	$F_{(2, 32)} = 3.108$, p = 0.058
	Positive affect	21.80 (7.19)	29.56 (7.08)	28.08 (7.79)	$F_{(2, 32)} = 2.185$, p = 0.129		Positive affect	27.40 (6.23)	28.44 (9.13)	32.00 (6.30)	$F_{(2, 32)} = 0.932$, p = 0.404
	Negative affect	15.20 (6.76)	19.00 (7.63)	23.67 (12.51)	$F_{(2, 32)} = 1.629$, p = 0.212		Negative affect	30.80 (11.99)	29.44 (8.55)	23.75 (6.98)	$F_{(2, 32)} = 1.972$, p = 0.156
Control component 1: Active control	Depression	19.13 (13.75) (n = 8)	12.89 (7.87) (n = 9)	14.56 (7.99) (n = 18)	$F_{(2, 32)} = 0.986$, p = 0.384	Control component 1: Active control	depression	22.25 (12.19) (n = 8)	22.89 (15.41) (n = 9)	28.06 (12.63) (n = 18)	$F_{(2, 32)} = 0.745$, p = 0.483
	State anxiety	41.25 (14.25	30.74 (10.77)	31.11 (10.16)	$F_{(2, 32)} = 2.537$, p = 0.095		State anxiety	45.83 (13.06)	46.67 (18.71)	52.41 (19.40)	$F_{(2, 32)} = 0.511$, p = 0.605
	Positive affect	27.38 (5.81)	26.67 (6.56)	28.83 (8.91)	$F_{(2, 32)} = 0.261$, p = 0.772		Positive affect	28.00 (8.72)	29.44 (4.72)	30.22 (9.04)	$F_{(2, 32)} = 0.209$, p = 0.813
	Negative affect	23.75 (8.96)	14.44 (3.58)	21.22 (11.13)	$F_{(2, 32)} = 2.410$, p = 0.106		Negative affect	22.75 (5.80)	24.56 (9.83)	31.44 (8.04)	$F_{(2, 32)} = 4.082$, p = 0.026
Control component 2: Passive control	Depression	12.64 (6.31) (n = 11)	16.73 (11.26) (n = 11)	16.00 (10.44) (n = 13)	$F_{(2, 32)} = 0.571$, p = 0.570	Control component 2: Passive control	Depression	20.82 (12.64) (n = 11)	23.64 (13.01) (n = 11)	30.77 (12.85) (n = 13)	$F_{(2, 32)} = 1.943$, p = 0.160
	State anxiety	31.52 (9.11)	36.97 (16.22)	31.79 (9.49)	$F_{(2, 32)} = 0.749$, p = 0.481		State anxiety	40.91 (13.51)	46.97 (19.12)	58.72 (16.47)	$F_{(2, 32)} = 3.639$, p = 0.038
	Positive affect	27.00 (7.72)	30.00 (6.89)	27.00 (8.29)	$F_{(2, 32)} = 0.573$, p = 0.569		Positive affect	30.09 (5.24)	34.18 (5.86)	25.08 (9.17)	$F_{(2, 32)} = 4.908$, p = 0.014
	Negative affect	16.27 (7.12)	23.82 (12.17)	20.08 (8.59)	$F_{(2, 32)} = 1.744$, p = 0.191		Negative affect	24.64 (9.12)	27.18 (7.67)	30.69 (9.13)	$F_{(2, 32)} = 1.471$, p = 0.245
Symptom perception	Depression	10.56 (8.11) (n = 9)	12.38 (6.38) (n = 16)	23.80 (9.91) (n = 10)	**$F_{(2, 32)} = 8.409$, p = 0.001 (but no significant post hoc)**	Symptom perception	Depression	29.56 (14.88) (n = 9)	25.00 (13.62) (n = 16)	22.30 (11.07) (n = 10)	$F_{(2, 32)} = 0.719$, p = 0.495
	State anxiety	29.63 (8.41)	30.00 (8.94)	42.00 (14.67)	$F_{(2, 32)} = 4.547$, p = 0.018		State anxiety	60.00 (17.16)	45.83 (16.80)	45.67 (17.57)	$F_{(2, 32)} = 2.313$, p = 0.115
	Positive affect	30.11 (9.48)	27.13 (7.27)	27.30 (6.62)	$F_{(2, 32)} = 0.480$, p = 0.623		Positive affect	26.22 (7.66)	29.69 (7.60)	32.20 (8.31)	$F_{(2, 32)} = 1.391$, p = 0.263
	Negative affect	17.33 (7.71)	16.81 (7.36)	27.70 (10.95)	**$F_{(2, 32)} = 5.540$, p = 0.009 (but no significant post hoc)**		Negative affect	30.56 (10.47)	27.38 (9.27)	25.60 (6.31)	$F_{(2, 32)} = 0.755$, p = 0.478
Future MI threat	Depression	14.50 (9.31) (n = 6)	13.92 (8.67) (n = 12)	16.29 (10.54) (n = 17)	$F_{(2, 32)} = 0.227$, p = 0.799	Future MI threat	Depression	30.50 (12.72) (n = 6)	29.17 (9.97) (n = 12)	20.94 (14.46) (n = 17)	$F_{(2, 32)} = 2.026$, p = 0.148
	State anxiety	34.44 (9.81)	28.61 (8.58)	36.27 (13.79)	$F_{(2, 32)} = 1.558$, p = 0.226		State anxiety	55.00 (12.43)	49.72 (13.81)	47.25 (21.77)	$F_{(2, 32)} = 0.410$, p = 0.667
	Positive affect	31.33 (1.63)	27.08 (9.83)	27.35 (7.08)	$F_{(2, 32)} = 0.714$, p = 0.498		Positive affect	31.50 (5.17)	29.83 (8.27)	28.59 (8.67)	$F_{(2, 32)} = 0.302$, p = 0.741
	Negative affect	21.83 (9.24)	17.75 (7.50)	21.06 (11.29)	$F_{(2, 32)} = 0.518$, p = 0.601		Negative affect	30.00 (8.00)	30.83 (6.75)	24.65 (9.73)	$F_{(2, 32)} = 2.110$, p = 0.138

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Appendix E- 22. Comparisons of time 2 moods between 3 couple groups (based on time 2 illness perception median split)

Couples' illness perception similarity in -	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI, p)
Causal component 1: Stress causes	Depression	8.08 (5.21) (n = 12)	13.11 (8.81) (n = 9)	15.869 (9.32) (n = 14)	$F_{(2, 32)} = 3.085$, p = 0.060	Causal component 1: Stress causes	depression	13.33 (13.94) (n = 12)	14.11 (10.74) (n = 9)	27.93 (14.72) (n = 14)	$F_{(2, 32)} = 4.662$, p = 0.017
	State anxiety	26.67 (7.39)	36.30 (16.87)	37.38 (11.71)	$F_{(2, 32)} = 2.890$, p = 0.070		State anxiety	40.00 (15.76)	39.63 (15.59)	57.86 (15.99)	**$F_{(2, 32)} = 5.453$, p = 0.009 (but no significant post hoc)**
	Positive affect	26.08 (9.63)	27.56 (9.14)	32.00 (6.31)	$F_{(2, 32)} = 1.782$, p = 0.185		Positive affect	28.17 (9.30)	31.56 (5.62)	29.14 (7.47)	$F_{(2, 32)} = 0.506$, p = 0.608
	Negative affect	13.83 (3.71)	16.78 (6.98)	19.64 (6.77)	$F_{(2, 32)} = 3.074$, p = 0.060		Negative affect	18.92 (10.77)	15.44 (6.48)	28.21 (11.07)	**$F_{(2, 32)} = 5.184$, p = 0.010 G2 – G1 = 12.77 (0.81 – 24.73), p = 0.006,**
Causal component 2: External causes	Depression	11.38 (8.30) (n = 8)	13.85 (10.82) (n = 13)	11.86 (6.31) (n = 14)	$F_{(2, 32)} = 0.262$, p = 0.771	Causal component 2: External causes	depression	13.38 (13.22) (n = 8)	17.62 (14.77) (n = 13)	24.43 (15.34) (n = 14)	$F_{(2, 32)} = 1.590$, p = 0.220
	State anxiety	35.83 (15.71)	33.59 (14.24)	31.90 (9.85)	$F_{(2, 32)} = 0.234$, p = 0.793		State anxiety	39.58 (12.27)	48.21 (21.46)	50.24 (16.51)	$F_{(2, 32)} = 0.957$, p = 0.395
	Positive affect	29.25 (7.65)	28.69 (10.49)	28.71 (7.45)	$F_{(2, 32)} = 0.012$, p = 0.988		Positive affect	32.25 (5.87)	28.92 (5.56)	28.29 (9.97)	$F_{(2, 32)} = 0.716$, p = 0.496
	Negative affect	15.63 (4.27)	19.00 (8.24)	15.71 (4.98)	$F_{(2, 32)} = 1.139$, p = 0.333		Negative affect	19.38 (10.97)	19.77 (10.07)	24.93 (2.25)	$F_{(2, 32)} = 0.948$, p = 0.398
Causal component 3: Unhealthy lifestyle cause	Depression	8.00 (4.81) (n = 8)	11.29 (8.67) (n = 17)	18.10 (8.02) (n = 10)	$F_{(2, 32)} = 4.117$, p = 0.026	Causal component 3: Unhealthy lifestyle cause	Depression	13.38 (10.39) (n = 8)	20.18 (16.47) (n = 17)	22.80 (15.17) (n = 10)	$F_{(2, 32)} = 0.929$, p = 0.405
	State anxiety	28.75 (7.11)	34.12 (13.20)	36.00 (15.30)	$F_{(2, 32)} = 0.760$, p = 0.476		State anxiety	43.33 (19.52)	46.67 (15.05)	50.67 (21.59)	$F_{(2, 32)} = 0.372$, p = 0.692
	Positive affect	32.63 (6.26)	26.82 (9.41)	29.20 (8.01)	$F_{(2, 32)} = 1.305$, p = 0.285		Positive affect	33.38 (5.26)	27.12 (7.44)	30.20 (8.75)	$F_{(2, 32)} = 2.002$, p = 0.152
	Negative affect	14.63 (5.37)	15.88 (5.37)	20.50 (7.47)	$F_{(2, 32)} = 2.588$, p = 0.091		Negative affect	20.25 (9.22)	21.18 (11.14)	23.90 (13.32)	$F_{(2, 32)} = 0.267$, p = 0.767
Consequence component 1: Physical consequences	Depression	7.70 (4.69) (n = 10)	12.17 (10.12) (n = 12)	16.46 (7.56) (n = 13)	$F_{(2, 32)} = 3.470$, p = 0.043	Consequence component 1: Physical consequences	Depression	9.90 (7.25) (n = 10)	18.33 (15.25) (n = 12)	27.62 (15.17) (n = 13)	$F_{(2, 32)} = 4.954$, p = 0.013
	State anxiety	26.67 (7.37)	31.39 (12.10)	40.51 (13.67)	$F_{(2, 32)} = 4.275$, p = 0.023		State anxiety	41.00 (15.95)	45.56 (18.33)	53.08 (17.97)	$F_{(2, 32)} = 1.403$, p = 0.261
	Positive affect	29.60 (9.10)	26.75 (9.31)	30.15 (7.49)	$F_{(2, 32)} = 0.544$, p = 0.586		Positive affect	26.80 (7.41)	30.42 (9.45)	30.54 (5.90)	$F_{(2, 32)} = 0.818$, p = 0.455
	Negative affect	12.70 (3.56)	16.92 (5.71)	20.15 (6.88)	$F_{(2, 32)} = 4.828$, p = 0.015		Negative affect	15.90 (7.02)	21.75 (9.23)	26.23 (13.74)	$F_{(2, 32)} = 2.649$, p = 0.086

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

(continued)

Couples' illness perception similarity in	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI; p)
Timeline	Depression	11.90 (6.51) (n = 10)	10.64 (5.16) (n = 11)	14.36 (11.46) (n = 14)	$F_{(2, 32)} = 0.612$, p = 0.548	Timeline	depression	13.50 (10.15) (n = 10)	23.09 (17.32) (n = 11)	20.64 (15.55) (n = 14)	$F_{(2, 32)} = 1.176$, p = 0.321
	State anxiety	28.33 (11.99)	32.73 (9.04)	37.62 (14.87)	$F_{(2, 32)} = 1.638$, p = 0.210		State anxiety	41.67 (16.42)	46.97 (19.23)	50.95 (17.76)	$F_{(2, 32)} = 0.787$, p = 0.464
	Positive affect	27.60 (8.86)	28.45 (8.01)	30.00 (9.07)	$F_{(2, 32)} = 0.237$, p = 0.790		Positive affect	27.40 (9.74)	30.91 (7.71)	29.71 (6.04)	$F_{(2, 32)} = 0.552$, p = 0.581
	Negative affect	14.80 (5.14)	15.36 (4.82)	19.64 (7.39)	$F_{(2, 32)} = 2.379$, p = 0.109		Negative affect	18.20 (6.63)	24.00 (13.78)	22.50 (11.65)	$F_{(2, 32)} = 0.748$, p = 0.482
Control component 1: Active control	Depression	11.83 (12.73) (n = 6)	11.69 (6.50) (n = 16)	13.77 (8.97) (n = 13)	$F_{(2, 32)} = 0.227$, p = 0.798	Control component 1: Active control	depression	15.50 (13.84) (n = 6)	22.88 (17.99) (n = 16)	16.85 (10.82) (n = 13)	$F_{(2, 32)} = 0.819$, p = 0.450
	State anxiety	33.89 (15.12)	33.96 (13.62)	32.56 (11.40)	$F_{(2, 32)} = 0.045$, p = 0.956		State anxiety	47.78 (16.01)	47.92 (16.00)	45.64 (21.53)	$F_{(2, 32)} = 0.061$, p = 0.941
	Positive affect	27.00 (9.49)	28.00 (8.43)	30.69 (8.47)	$F_{(2, 32)} = 0.513$, p = 0.604		Positive affect	31.50 (6.09)	28.56 (8.04)	29.54 (8.15)	$F_{(2, 32)} = 0.311$, p = 0.735
	Negative affect	17.50 (6.16)	16.06 (6.15)	17.69 (6.93)	$F_{(2, 32)} = 0.258$, p = 0.774		Negative affect	18.83 (9.45)	24.44 (12.29)	19.77 (10.47)	$F_{(2, 32)} = 0.864$, p = 0.431
Control component 2: Passive control	Depression	11.43 (8.28) (n = 7)	10.77 (9.84) (n = 13)	14.47 (7.40) (n = 15)	$F_{(2, 32)} = 0.718$, p = 0.495	Control component 2: Passive control	Depression	8.00 (6.38) (n = 7)	19.62 (15.57) (n = 13)	24.47 (14.98) (n = 15)	$F_{(2, 32)} = 3.295$, p = 0.050
	State anxiety	35.24 (11.84)	32.82 (12.75)	33.11 (13.83)	$F_{(2, 32)} = 0.086$, p = 0.918		State anxiety	34.76 (11.68)	49.74 (17.61)	50.44 (18.64)	$F_{(2, 32)} = 2.253$, p = 0.122
	Positive affect	30.29 (7.99)	27.54 (9.55)	29.27 (8.18)	$F_{(2, 32)} = 0.261$, p = 0.772		Positive affect	32.29 (5.88)	28.15 (6.07)	29.20 (9.50)	$F_{(2, 32)} = 0.662$, p = 0.523
	Negative affect	17.71 (7.14)	16.23 (6.81)	17.13 (5.87)	$F_{(2, 32)} = 0.134$, p = 0.875		Negative affect	16.43 (6.60)	22.23 (10.29)	23.80 (13.23)	$F_{(2, 32)} = 1.062$, p = 0.358
Symptom perception	Depression	8.92 (6.64) (n = 12)	6.75 (4.06) (n = 8)	18.40 (8.03) (n = 15)	**$F_{(2, 32)} = 10.008$, p < 0.001 G2 – G0 = 9.48 (0.44 – 18.53), p = 0.007 G2 – G1 = 11.65 (3.42 – 19.88), p < 0.001**	Symptom perception	Depression	11.75 (8.07) (n = 12)	29.88 (20.00) (n = 8)	19.87 (13.33) (n = 15)	$F_{(2, 32)} = 4.220$, p = 0.024
	State anxiety	30.28 (13.89)	25.42 (6.41)	40.22 (11.23)	$F_{(2, 32)} = 5.078$, p = 0.012		State anxiety	42.78 (14.62)	55.42 (24.68)	46.00 (15.39)	$F_{(2, 32)} = 1.282$, p = 0.291
	Positive affect	29.58 (9.41)	27.75 (11.39)	28.80 (6.30)	$F_{(2, 32)} = 0.106$, p = 0.900		Positive affect	29.25 (8.19)	26.50 (8.62)	31.13 (6.65)	$F_{(2, 32)} = 0.959$, p = 0.394
	Negative affect	15.17 (5.06)	11.63 (1.77)	21.13 (6.12)	**$F_{(2, 32)} = 10.202$, p < 0.001 G2 – G1 = 9.51 (3.85 – 15.16), p < 0.001**		Negative affect	17.83 (8.81)	28.25 (15.04)	21.40 (9.58)	$F_{(2, 32)} = 2.252$, p = 0.122
Future MI threat	Depression	12.25 (8.46) (n = 4)	12.00 (6.71) (n = 13)	12.89 (9.95) (n = 18)	$F_{(2, 32)} = 0.041$, p = 0.960	Future MI threat	Depression	17.50 (14.36) (n = 4)	20.54 (16.09) (n = 13)	18.94 (15.00) (n -= 18)	$F_{(2, 32)} = 0.074$, p = 0.929
	State anxiety	36.67 (15.63)	32.05 (13.44)	33.70 (12.20)	$F_{(2, 32)} = 0.220$, p = 0.820		State anxiety	48.33 (21.86)	45.90 (19.59)	47.59 (16.56)	$F_{(2, 32)} = 0.044$, p = 0.957
	Positive affect	34.50 (6.14)	27.23 (9.61)	28.72 (7.93)	$F_{(2, 32)} = 1.132$, p = 0.335		Positive affect	31.50 (5.26)	29.38 (10.04)	29.00 (6.32)	$F_{(2, 32)} = 0.166$, p = 0.847
	Negative affect	17.25 (6.13)	15.08 (4.80)	18.17 (7.25)	$F_{(2, 32)} = 0.906$, p = 0.414		Negative affect	22.50 (5.57)	22.77 (13.71)	20.83 (10.48)	$F_{(2, 32)} = 0.117$, p = 0.890

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control); G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Appendix E- 23. Comparisons of time 3 moods between 3 couple groups (based on time 3 illness perception median split)

Couples' illness perception similarity in –	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI; p)
Causal component 1: Stress causes	Depression	8.90 (4.61) (n = 10)	8.15 (5.89) (n = 13)	15.92 (9.67) (n = 12)	$F_{(2, 32)} = 4.299$, p = 0.022	Causal component 1: Stress causes	depression	14.80 (12.51) (n = 10)	15.85 (14.40) (n = 13)	16.42 (13.26) (n = 12)	$F_{(2, 32)} = 0.040$, p = 0.961
	State anxiety	29.33 (5.62)	30.51 (11.93)	39.17 (11.47)	$F_{(2, 32)} = 3.119$, p = 0.058		State anxiety	40.00 (17.86)	45.64 (16.80)	41.39 (14.39)	$F_{(2, 32)} = 0.246$, p = 0.784
	Positive affect	28.10 (7.68)	30.08 (9.29)	31.92 (6.84)	$F_{(2, 32)} = 0.612$, p = 0.549		Positive affect	28.90 (8.48)	29.92 (9.30)	35.42 (9.81)	$F_{(2, 32)} = 1.657$, p = 0.207
	Negative affect	11.80 (1.48)	15.00 (6.04)	19.42 (7.96)	$F_{(2, 32)} = 4.489$, p = 0.019		Negative affect	19.30 (11.63)	18.85 (11.24)	17.75 (6.81)	$F_{(2, 32)} = 0.071$, p = 0.932
Causal component 2: External causes	Depression	11.38 (8.30) (n = 6)	13.85 (10.82) (n = 11)	11.86 (6.31) (n = 18)	$F_{(2, 32)} = 0.714$, p = 0.498	Causal component 2: External causes	depression	17.33 (12.80) (n = 6)	13.91 (14.35) (n = 11)	16.33 (13.07) (n = 18)	$F_{(2, 32)} = 0.162$, p = 0.851
	State anxiety	35.83 (15.71)	33.59 (14.24)	31.90 (9.85)	$F_{(2, 32)} = 1.926$, p = 0.162		State anxiety	55.56 (16.15)	38.18 (13.45)	42.04 (15.97)	$F_{(2, 32)} = 2.615$, p = 0.089
	Positive affect	29.25 (7.65)	28.69 (10.49)	28.71 (7.45)	$F_{(2, 32)} = 2.133$, p = 0.135		Positive affect	31.67 (5.95)	32.36 (8.70)	30.94 (10.89)	$F_{(2, 32)} = 0.074$, p = 0.929
	Negative affect	15.63 (4.27)	19.00 (8.24)	15.71 (4.98)	$F_{(2, 32)} = 0.733$, p = 0.489		Negative affect	21.33 (12.13)	16.55 (7.85)	18.94 (10.33)	$F_{(2, 32)} = 0.472$, p = 0.628
Causal component 3: Unhealthy lifestyle cause	Depression	10.67 (8.78) (n = 12)	6.00 (4.14) (n = 8)	14.00 (7.42) (n = 15)	$F_{(2, 32)} = 3.095$, p = 0.059	Causal component 3: Unhealthy lifestyle cause	Depression	9.25 (7.42) (n = 12)	25.13 (15.70) (n = 8)	15.93 (12.82) (n = 15)	$F_{(2, 32)} = 4.182$, p = 0.024
	State anxiety	33.06 (9.15)	27.08 (8.05)	36.44 (12.75)	$F_{(2, 32)} = 2.003$, p = 0.151		State anxiety	36.11 (13.24)	54.17 (19.66)	42.89 (13.27)	$F_{(2, 32)} = 3.531$, p = 0.041
	Positive affect	32.25 (6.90)	27.50 (10.70)	29.87 (7.19)	$F_{(2, 32)} = 0.861$, p = 0.432		Positive affect	34.83 (8.21)	26.38 (7.13)	31.60 (10.64)	$F_{(2, 32)} = 2.049$, p = 0.145
	Negative affect	15.25 (7.06)	15.25 (7.67)	16.07 (6.05)	$F_{(2, 32)} = 0.062$, p = 0.940		Negative affect	13.25 (4.45)	27.63 (13.99)	18.07 (6.92)	**$F_{(2, 32)} = 7.078$, p = 0.003 (but not significant post hoc)**
Consequence component 1: Physical consequences	Depression	8.00 (6.46) (n = 9)	9.36 (8.39) (n = 11)	14.07 (7.49) (n = 15)	$F_{(2, 32)} = 2.207$, p = 0.127	Consequence component 1: Physical consequences	Depression	8.33 (6.87) (n = 9)	17.82 (14.62) (n = 11)	18.67 (13.78) (n =- 15)	$F_{(2, 32)} = 2.071$, p = 0.143
	State anxiety	29.26 (10.11)	30.61 (9.64)	37.33 (11.63)	$F_{(2, 32)} = 2.066$, p = 0.143		State anxiety	35.19 (12.15)	42.73 (17.50)	48.22 (15.73)	$F_{(2, 32)} = 1.991$, p = 0.153
	Positive affect	30.56 (8.26)	29.64 (8.78)	30.27 (7.74)	$F_{(2, 32)} = 0.034$, p = 0.967		Positive affect	33.33 (10.60)	30.55 (10.26)	31.13 (8.59)	$F_{(2, 32)} = 0.227$, p = 0.798
	Negative affect	12.56 (5.10)	16.45 (8.43)	16.80 (5.65)	$F_{(2, 32)} = 1.325$, p = 0.280		Negative affect	12.33 (2.96)	20.00 (1.45)	21.33 (9.97)	$F_{(2, 32)} = 2.812$, p = 0.075

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

(continued)

Couples' illness perception similarity in –	Patient mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouse mood Mean (SD)	G0: Both disagree	G1: Dissimilar	G2: Both agree	F/ Post hoc results (99% CI; p)
Timeline	Depression	9.75 (4.17) (n = 8)	10.85 (10.04) (n = 13)	11.93 (7.44) (n = 14)	$F_{(2, 32)} = 0.194$, p = 0.825	Timeline	depression	20.50 (12.86) (n = 8)	17.92 (14.72) (n = 13)	11.00 (10.84) (n = 14)	$F_{(2, 32)} = 1.689$, p = 0.201
	State anxiety	27.50 (10.50)	32.05 (9.28)	37.38 (11.71)	$F_{(2, 32)} = 2.326$, p = 0.114		State anxiety	50.00 (10.39)	45.13 (18.14)	37.38 (15.37)	$F_{(2, 32)} = 1.836$, p = 0.176
	Positive affect	30.00 (8.67)	30.31 (9.38)	30.07 (6.67)	$F_{(2, 32)} = 0.004$, p = 0.996		Positive affect	26.38 (7.07)	30.92 (9.48)	35.00 (9.66)	$F_{(2, 32)} = 2.338$, p = 0.113
	Negative affect	11.88 (2.36)	17.23 (8.48)	16.21 (5.73)	$F_{(2, 32)} = 1.818$, p = 0.179		Negative affect	22.50 (10.46)	19.15 (10.15)	15.86 (8.88)	$F_{(2, 32)} = 1.221$, p = 0.308
Control component 1: Active control	Depression	10.89 (9.32) (n = 9)	10.75 (8.55) (n = 12)	11.36 (6.64) (n = 14)	$F_{(2, 32)} = 0.020$, p = 0.980	Control component 1: Active control	depression	23.44 (10.58) (n = 9)	12.42 (13.93) (n = 12)	13.64 (12.67) (n = 14)	$F_{(2, 32)} = 2.279$, p = 0.119
	State anxiety	33.70 (12.85)	30.83 (9.65)	34.76 (11.30)	$F_{(2, 32)} = 0.413$, p = 0.665		State anxiety	54.07 (14.60)	37.22 (16.44)	41.19 (13.69)	$F_{(2, 32)} = 3.484$, p = 0.043
	Positive affect	24.67 (9.17)	30.17 (6.51)	33.64 (6.69)	$F_{(2, 32)} = 4.109$, p = 0.026		Positive affect	22.22 (6.63)	33.67 (9.12)	35.64 (7.28)	**$F_{(2, 32)} = 8.766$, p = 0.001 G2 – G0 = 13.42 (3.66 – 23.18), p = 0.001 G1 – G0 = 11.44 (0.10 – 22.79), p = 0.009**
	Negative affect	15.67 (7.53)	15.08 (5.62)	16.00 (7.19)	$F_{(2, 32)} = 0.060$, p = 0.942		Negative affect	23.00 (8.72)	16.50 (10.36)	17.57 (9.72)	$F_{(2, 32)} = 1.283$, p = 0.291
Control component 2: Passive control	Depression	8.63 (7.01) (n = 8)	11.15 (7.29) (n = 13)	12.29 (8.88) (n = 14)	$F_{(2, 32)} = 0.547$, p = 0.584	Control component 2: Passive control	Depression	15.00 (13.57) (n = 8)	16.46 (16.98) (n = 13)	15.50 (9.12) (n = 14)	$F_{(2, 32)} = 0.033$, p = 0.968
	State anxiety	30.83 (10.20)	33.08 (11.09)	34.52 (11.88)	$F_{(2, 32)} = 0.275$, p = 0.761		State anxiety	45.83 (20.84)	42.05 (16.97)	42.62 (12.69)	$F_{(2, 32)} = 0.144$, p = 0.867
	Positive affect	34.13 (8.48)	26.69 (7.05)	31.07 (7.68)	$F_{(2, 32)} = 2.518$, p = 0.097		Positive affect	33.75 (7.46)	31.85 (7.87)	29.93 (11.82)	$F_{(2, 32)} = 0.416$, p = 0.663
	Negative affect	16.50 (7.09)	14.08 (5.44)	16.50 (7.46)	$F_{(2, 32)} = 0.537$, p = 0.590		Negative affect	18.38 (13.26)	19.54 (11.90)	17.86 (4.88)	$F_{(2, 32)} = 0.097$, p = 0.908
Symptom perception	Depression	8.33 (5.21) (n = 12)	9.38 (6.63) (n = 8)	14.07 (9.34) (n = 15)	$F_{(2, 32)} = 2.167$, p = 0.131	Symptom perception	Depression	9.25 (9.64) (n = 12)	16.50 (12.12) (n = 8)	20.53 (14.49) (n = 15)	$F_{(2, 32)} = 2.742$, p = 0.080
	State anxiety	30.28 (9.58)	35.42 (12.46)	34.22 (11.51)	$F_{(2, 32)} = 0.637$, p = 0.535		State anxiety	35.56 (13.36)	42.92 (17.68)	49.33 (15.23)	$F_{(2, 32)} = 2.738$, p = 0.080
	Positive affect	34.58 (7.47)	27.88 (5.99)	27.80 (8.18)	$F_{(2, 32)} = 3.200$, p = 0.054		Positive affect	33.33 (10.65)	30.38 (11.17)	30.67 (7.77)	$F_{(2, 32)} = 0.328$, p = 0.722
	Negative affect	14.83 (6.79)	16.25 (8.40)	15.87 (5.77)	$F_{(2, 32)} = 0.125$, p = 0.883		Negative affect	14.25 (5.64)	16.75 (9.10)	23.07 (11.26)	$F_{(2, 32)} = 3.276$, p = 0.051
Future MI threat	Depression	8.00 (4.76) (n = 4)	8.25 (7.07) (n = 12)	13.42 (9.23) (n = 19)	$F_{(2, 32)} = 2.074$, p = 0.142	Future MI threat	Depression	7.00 (5.48) (n = 4)	15.75 (17.20) (n = 12)	17.58 (10.88) (n -= 19)	$F_{(2, 32)} = 1.081$, p = 0.351
	State anxiety	29.17 (8.33)	29.44 (10.52)	36.32 (11.22)	$F_{(2, 32)} = 1.815$, p = 0.179		State anxiety	39.17 (13.71)	39.44 (17.46)	46.32 (16.51)	$F_{(2, 32)} = 0.812$, p = 0.453
	Positive affect	34.50 (7.33)	30.83 (7.57)	28.79 (8.34)	$F_{(2, 32)} = 0.912$, p = 0.412		Positive affect	35.75 (4.65)	33.58 (10.59)	29.32 (9.17)	$F_{(2, 32)} = 1.223$, p = 0.308
	Negative affect	14.75 (7.54)	15.00 (7.12)	16.16 (6.40)	$F_{(2, 32)} = 0.143$, p = 0.867		Negative affect	15.00 (6.63)	20.33 (12.57)	18.26 (8.50)	$F_{(2, 32)} = 0.455$, p = 0.639

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Appendix E- 24. Comparisons of the 35 couples' moods at 4-8 weeks post-MI by using illness perception median score during hospitalisation (3 group)

Couples' illness perception similarity in -	Patients' mood					Spouses' mood				
	Mood Mean (SD)	Both disagree	Dissimilar	Both agree	F/ Post hoc results	Couples' illness perception similarity		Both disagree	Dissimilar	Both agree	F/ Post hoc results (99% CI; p value)
Causal component 1: Stress	Depression	11.55 (7.19) (n = 11)	9.80 (7.53) (n = 10)	15.14 (9.76) (n = 14)	$F_{(2, 32)} = 1.277$, p = 0.293	Causal component 1: Stress	depression	15.36 (16.35) (n = 11)	13.60 (9.51) (n = 10)	26.64 (14.80) (n = 14)	$F_{(2, 32)} = 3.157$, p = 0.056
	State anxiety	35.15 (14.93)	30.33 (10.82)	34.29 (12.64)	$F_{(2, 32)} = 0.414$, p = 0.664		State anxiety	43.33 (14.22)	34.33 (11.01)	59.05 (17.17)	**$F_{(2, 32)} = 8.720$, p = 0.001 G2 – G1 = 24.71 (6.02 – 43.41), p = 0.001**
	Positive affect	27.18 (9.30)	27.00 (7.65)	31.43 (8.34)	$F_{(2, 32)} = 1.101$, p = 0.345		Positive affect	27.82 (5.44)	31.80 (9.83)	29.00 (7.54)	$F_{(2, 32)} = 0.734$, p = 0.488
	Negative affect	16.73 (4.69)	15.40 (6.42)	18.14 (7.44)	$F_{(2, 32)} = 0.543$, p = 0.586		Negative affect	19.09 (11.14)	14.60 (4.22)	28.93 (10.87)	**$F_{(2, 32)} = 7.141$, p = 0.003 G2 – G1 = 14.32 (3.69 – 24.97), p = 0.001**
Causal component 2: External causes	Depression	17.67 (11.20) (n = 12)	9.75 (5.57) (n = 8)	9.80 (5.05) (n = 15)	$F_{(2, 32)} = 4.013$, p = 0.028	Causal component 2: External	depression	14 75 (11.73) (n = 12)	18.38 (15.39) (n = 8)	23.60 (16.65) (n = 15)	$F_{(2, 32)} = 1.208$, p = 0.312
	State anxiety	41.11 (15.40)	32.92 (9.33)	27.56 (8.68)	$F_{(2, 32)} = 4.598$, p = 0.018		State anxiety	44.44 (16.47)	46.25 (18.30)	49.56 (19.31)	$F_{(2, 32)} = 0.274$, p = 0.762
	Positive affect	26.83 (7.18)	29.00 (9.74)	30.33 (9.02)	$F_{(2, 32)} = 0.553$, p = 0.581		Positive affect	31.00 (5.56)	30.00 (6.23)	27.87 (9.67)	$F_{(2, 32)} = 0.573$, p = 0.569
	Negative affect	20.58 (6.45)	16.00 (6.19)	14.47 (5.15)	$F_{(2, 32)} = 3.766$, p = 0.034		Negative affect	18.33 (9.48)	24.63 (12.33)	22.93 (11.85)	$F_{(2, 32)} = 0.904$, p = 0.415
Causal component 3: lifestyles	Depression	12.58 (9.77) (n = 12)	7.86 (4.74) (n = 7)	14.44 (8.37) (n = 16)	$F_{(2, 32)} = 1.512$, p = 0.236	Causal component 3: Lifestyles	Depression	13.92 (14.34) (n = 12)	22.29 (13.24) (n = 7)	22.19 (15.77) (n = 16)	$F_{(2, 32)} = 1.234$, p = 0.304
	State anxiety	36.94 (11.76)	28.57 (12.15)	32.92 (13.60)	$F_{(2, 32)} = 0.981$, p = 0.386		State anxiety	42.22 (14.09)	47.62 (18.53)	50.42 (20.03)	$F_{(2, 32)} = 0.722$, p = 0.493
	Positive affect	30.00 (4.57)	25.71 (14.12)	29.31 (7.91)	$F_{(2, 32)} = 0.596$, p = 0.557		Positive affect	31.25 (5.75)	28.14 (5.90)	28.63 (9.51)	$F_{(2, 32)} = 0.512$, p = 0.604
	Negative affect	16.67 (5.87)	14.71 (6.05)	18.06 (6.84)	$F_{(2, 32)} = 0.686$, p = 0.511		Negative affect	18.33 (8.47)	25.29 (9.45)	22.75 (13.36)	$F_{(2, 32)} = 0.974$, p = 0.389
Consequence component 1: Physical	Depression	7.67 (3.14) (n = 6)	12.67 (10.04) (n = 18)	14.82 (6.95) (n = 11)	$F_{(2, 32)} = 1.424$, p = 0.256	Consequence component 1: Physical	Depression	7.17 (7.49) (n = 6)	17.44 (13.96) (n = 18)	29.18 (14.05) (n =- 11)	**$F_{(2, 32)} = 5.804$, p = 0.007 G2 – G0 = 22.02 (4.15 – 39.88), p = 0.002**
	State anxiety	25.56 (5.44)	37.78 (14.60)	30.61 (9.64)	$F_{(2, 32)} = 2.724$, p = 0.081		State anxiety	34.44 (8.86)	45.37 (15.85)	56.67 (20.11)	$F_{(2, 32)} = 3.715$, p = 0.035
	Positive affect	24.17 (7.76)	29.72 (7.80)	29.91 (9.80)	$F_{(2, 32)} = 1.099$, p = 0.346		Positive affect	29.50 (5.99)	28.44 (7.84)	31.00 (8.50)	$F_{(2, 32)} = 0.367$, p = 0.696
	Negative affect	12.50 (3.02)	18.06 (5.82)	17.45 (7.69)	$F_{(2, 32)} = 1.897$, p = 0.167		Negative affect	15.17 (5.57)	19.44 (9 78)	29.09 (12.32)	$F_{(2, 32)} = 4.601$, p = 0.018
Consequence component 2: Emotional	Depression	7.25 (4.77) (n = 12)	14.36 (7.47) (n = 11)	16.00 (10.09) (n = 12)	$F_{(2, 32)} = 4.280$, p = 0.023	Consequence component 2: Emotional	Depression	7.50 (6.20) (n = 12)	26.64 (16.26) (n = 11)	24.58 (13.22) (n = 12)	**$F_{(2, 32)} = 8.332$, p = 0.001 G2 – G0 = 17.08 (2.77 – 31.40), p = 0.003 G1 – G0 = 19.14 (0.71 – 37.56), p = 0.006**
	State anxiety	26.67 (6.51)	36.97 (16.02)	36.94 (12.18)	$F_{(2, 32)} = 2.864$, p = 0.072		State anxiety	35.28 (10.20)	49.39 (15.19)	56.67 (20.10)	**$F_{(2, 32)} = 5.742$, p = 0.007 (but no significant post hoc)**
	Positive affect	28.17 (8.20)	28.27 (9.11)	30.00 (8.83)	$F_{(2, 32)} = 0.166$, p = 0.848		Positive affect	28.58 (7.96)	29.18 (6.94)	30.50 (8.47)	$F_{(2, 32)} = 0.187$, p = 0.830
	Negative affect	13.25 (3.52)	19.00 (6.51)	18.67 (7.06)	$F_{(2, 32)} = 3.547$, p = 0.041		Negative affect	14.00 (4.77)	25.00 (12.52)	26.50 (10.96)	**$F_{(2, 32)} = 5.646$, p = 0.008 G2 – G0 = 12.50 (0.71 – 24.29), p = 0.007** d =

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

(continued)

Couples' illness perception similarity in -	State mood Mean (SD)	Patients' mood: Both disagree	Dissimilar	Both agree	F/ Post hoc results	Couples' illness perception similarity in -		Spouses' mood: Both disagree	Dis-similar	Both agree	F/ Post hoc results (99% CI; p value)
Timeline	Depression	9.20 (3.96) (n = 5)	10.72 (6.34) (n = 18)	16.50 (11.26) (n = 12)	$F_{(2, 32)} = 2.266$, p = 0.120	Timeline	depression	25.20 (18.49) (n = 5)	19.67 (14.72) (n = 18)	16.50 (14.36) (n = 12)	$F_{(2, 32)} = 0.591$, p = 0.560
	State anxiety	30.00 (5.77)	30.19 (11.17)	39.72 (15.14)	$F_{(2, 32)} = 2.432$, p = 0.105		State anxiety	51.33 (17.58)	45.93 (18.13)	46.94 (18.56)	$F_{(2, 32)} = 0.173$, p = 0.842
	Positive affect	24.60 (5.68)	29.78 (9.78)	29.17 (7.33)	$F_{(2, 32)} = 0.730$, p = 0.490		Positive affect	29.00 (5.79)	29.17 (8.96)	30.00 (6.65)	$F_{(2, 32)} = 0.049$, p = 0.952
	Negative affect	11.60 (1.34)	16.39 (5.93)	19.92 (6.71)	$F_{(2, 32)} = 3.698$, p = 0.036		Negative affect	28.60 (15.95)	22.61 (10.04)	17.58 (9.81)	$F_{(2, 32)} = 1.926$, p = 0.162
Control component 1: Active control	Depression	12.75 (13.71) (n = 8)	10.22 (4.66) (n = 9)	13.50 (7.24) (n = 18)	$F_{(2, 32)} = 0.438$, p = 0.649	Control component 1: Active control	depression	15.88 (13.92) (n = 8)	19.44 (16.42) (n = 9)	20.89 (15.21) (n = 18)	$F_{(2, 32)} = 0.299$, p = 0.743
	State anxiety	34.17 (12.57)	31.48 (9.59)	34.07 (14.58)	$F_{(2, 32)} = 0.135$, p = 0.874		State anxiety	49.17 (19.82)	41.48 (12.03)	48.89 (19.47)	$F_{(2, 32)} = 0.581$, p = 0.565
	Positive affect	29.63 (7.21)	26.33 (9.85)	29.72 (8.53)	$F_{(2, 32)} = 0.508$, p = 0.606		Positive affect	30.25 (6.88)	28.22 (4.44)	29.67 (9.34)	$F_{(2, 32)} = 0.158$, p = 0.854
	Negative affect	17.63 (7.63)	14.11 (5.01)	18.00 (6.18)	$F_{(2, 32)} = 1.220$, p = 0.309		Negative affect	19.13 (7.97)	20.11 (9.33)	23.72 (13.19)	$F_{(2, 32)} = 0.583$, p = 0.564
Control component 2: Passive control	Depression	9.82 (6.60) (n = 11)	15.82 (10.27) (n = 11)	11.92 (7.90) (n = 13)	$F_{(2, 32)} = 1.461$, p = 0.247	Control component 2: Passive control	Depression	11.64 (11.50) (n = 11)	16.55 (11.79) (n = 11)	28.31 (16.04) (n = 13)	$F_{(2, 32)} = 4.920$, p = 0.014
	State anxiety	32.12 (9.80)	39.70 (17.35)	29.23 (8.41)	$F_{(2, 32)} = 2.258$, p = 0.121		State anxiety	40.30 (13.54)	43.64 (16.22)	55.64 (19.74)	$F_{(2, 32)} = 2.781$, p = 0.077
	Positive affect	30.00 (9.07)	29.73 (8.06)	27.08 (8.74)	$F_{(2, 32)} = 0.428$, p = 0.656		Positive affect	30.09 (5.11)	33.09 (4.18)	25.77 (10.12)	$F_{(2, 32)} = 3.139$, p = 0.057
	Negative affect	16.18 (4.51)	19.27 (7.53)	15.54 (6.41)	$F_{(2, 32)} = 1.162$, p = 0.326		Negative affect	19.00 (9.57)	19.45 (9.82)	26.00 (12.88)	$F_{(2, 32)} = 1.554$, p = 0.227
Symptom perception	Depression	9.44 (4.61) (n = 9)	12.50 (7.10) (n = 16)	15.20 (12.30) (n = 10)	$F_{(2, 32)} = 1.097$, p = 0.346	Symptom perception	Depression	24.78 (18.85) (n = 9)	18.44 (14.98) (n = 16)	16.00 (10.46) (n = 10)	$F_{(2, 32)} = 0.869$, p = 0.429
	State anxiety	29.63 (7.72)	35.21 (14.35)	34.00 (13.95)	$F_{(2, 32)} = 0.553$, p = 0.580		State anxiety	53.70 (17.75)	45.21 (14.71)	44.00 (22.16)	$F_{(2, 32)} = 0.858$, p = 0.434
	Positive affect	30.89 (5.99)	28.38 (8.46)	27.70 (10.74)	$F_{(2, 32)} = 0.362$, p = 0.699		Positive affect	28.56 (9.85)	29.00 (6.74)	30.90 (7.46)	$F_{(2, 32)} = 0.257$, p = 0.775
	Negative affect	14.56 (5.27)	16.94 (5.69)	19.00 (7.85)	$F_{(2, 32)} = 1.187$, p = 0.318		Negative affect	26.56 (16.24)	22.06 (9.50)	16.90 (6.12)	$F_{(2, 32)} = 1.871$, p = 0.170
Future MI threat	Depression	10.00 (8.10) (n = 6)	10.67 (5.45) (n = 12)	14.65 (10.11) (n = 17)	$F_{(2, 32)} = 1.092$, p = 0.348	Future MI threat	Depression	21.33 (16.78) (n = 6)	18.83 (13.31) (n = 12)	19.06 (16.20) (n = 17)	$F_{(2, 32)} = 0.060$, p = 0.942
	State anxiety	34.44 (12.94)	28.61 (10.10)	36.47 (13.92)	$F_{(2, 32)} = 1.398$, p = 0.262		State anxiety	45.56 (20.40)	43.61 (12.67)	50.00 (20.28)	$F_{(2, 32)} = 0.465$, p = 0.632
	Positive affect	34.17 (8.18)	24.92 (9.78)	29.71 (6.60)	$F_{(2, 32)} = 2.821$, p = 0.074		Positive affect	31.67 (5.72)	29.17 (7.30)	28.82 (8.68)	$F_{(2, 32)} = 0.304$, p = 0.740
	Negative affect	16.00 (5.51)	15.50 (5.84)	18.24 (6.93)	$F_{(2, 32)} = 0.724$, p = 0.492		Negative affect	23.33 (10.86)	22.25 (9.67)	20.82 (12.74)	$F_{(2, 32)} = 0.124$, p = 0.884

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Appendix E- 25. Comparisons of the 35 couples' moods at 6-month post-MI by using illness perception median score during hospitalisation (3 group)

Couples' illness perception similarity in -	State mood Mean (SD)	Patients' mood: Both disagree	Patients' mood: Dissimilar	Patients' mood: Both agree	F/ Post hoc results	Couples' illness perception similarity in -	Spouses' moods	Spouses' moods: Both disagree	Spouses' moods: Dissimilar	Spouses' moods: Both agree	F/ Post hoc results (99% CI; p value)
Causal component 1: Stress	Depression	8.91 (5.65) (n = 11)	7.50 (5.56) (n = 10)	15.21 (9.02) (n = 14)	$F_{(2, 32)} = 4.051$, p = 0.027	Causal component 1: Stress	depression	13.91 (12.06) (n = 11)	11.80 (10.76) (n = 10)	20.00 (14.94) (n = 14)	$F_{(2, 32)} = 1.323$, p = 0.281
	State anxiety	30.00 (7.89)	33.33 (11.11)	35.48 (12.98)	$F_{(2, 32)} = 0.755$, p = 0.478		State anxiety	41.82 (16.89)	36.00 (12.75)	49.29 (15.92)	$F_{(2, 32)} = 2.225$, p = 0.125
	Positive affect	28.27 (7.58)	30.90 (7.84)	31.07 (8.67)	$F_{(2, 32)} = 0.428$, p = 0.656		Positive affect	28.45 (6.46)	33.40 (11.87)	32.57 (9.56)	$F_{(2, 32)} = 0.859$, p = 0.433
	Negative affect	13.82 (4.62)	11.90 (1.60)	19.64 (8.04)	**$F_{(2, 32)} = 5.948$, p = 0.006 G2 – G1 = 7.74 (0.14 – 15.35), p = 0.009**		Negative affect	18.00 (11.12)	15.70 (6.48)	21.14 (10.62)	$F_{(2, 32)} = 0.928$, p = 0.406
Causal component 2: External causes	Depression	13.42 (8.48) (n = 12)	13.88 (7.02) (n = 8)	7.60 (6.71) (n = 15)	$F_{(2, 32)} = 2.806$, p = 0.075	Causal component 2: External causes	depression	15.08 (14.57) (n = 12)	17.13 (10.82) (n = 8)	15.53 (13.80) (n = 15)	$F_{(2, 32)} = 0.058$, p = 0.944
	State anxiety	37.22 (11.09)	38.33 (8.73)	27.11 (9.50)	$F_{(2, 32)} = 4.883$, p = 0.014		State anxiety	42.78 (17.34)	42.08 (14.58)	44.00 (16.58)	$F_{(2, 32)} = 0.040$, p = 0.961
	Positive affect	29.00 (5.72)	28.38 (9.67)	32.00 (8.68)	$F_{(2, 32)} = 0.715$, p = 0.497		Positive affect	33.75 (7.90)	29.63 (11.29)	30.73 (9.82)	$F_{(2, 32)} = 0.534$, p = 0.592
	Negative affect	15.92 (5.96)	16.88 (7.34)	14.67 (6.98)	$F_{(2, 32)} = 0.301$, p = 0.742		Negative affect	18.08 (10.63)	16.25 (8.80)	20.27 (9.95)	$F_{(2, 32)} = 0.450$, p = 0.642
Causal component 3: lifestyles	Depression	10.42 (9.53) (n = 12)	8.43 (3.36) (n = 7)	12.63 (7.81) (n = 16)	$F_{(2, 32)} = 0.747$, p = 0.482	Causal component 3: lifestyles	Depression	13.67 (11.92) (n = 12)	13.00 (14.21) (n = 7)	18.50 (13.77) (n = 16)	$F_{(2, 32)} = 0.644$, p = 0.532
	State anxiety	32.22 (10.38)	31.90 (9.79)	34.38 (12.40)	$F_{(2, 32)} = 0.178$, p = 0.838		State anxiety	37.78 (13.88)	42.38 (17.29)	47.50 (16.53)	$F_{(2, 32)} = 1.364$, p = 0.285
	Positive affect	31.92 (6.53)	28.00 (8.58)	29.75 (8.86)	$F_{(2, 32)} = 0.555$, p = 0.580		Positive affect	33.58 (7.55)	33.14 (9.06)	29.25 (10.82)	$F_{(2, 32)} = 0.846$, p = 0.439
	Negative affect	14.33 (5.50)	16.29 (8.64)	16.25 (6.68)	$F_{(2, 32)} = 0.324$, p = 0.726		Negative affect	15.83 (10.09)	18.14 (8.76)	20.88 (10.01)	$F_{(2, 32)} = 0.914$, p = 0.411
Consequence component 1: Physical	Depression	7.17 (2.71) (n = 6)	10.22 (8.18) (n = 18)	14.45 (8.19) (n = 11)	$F_{(2, 32)} = 1.998$, p = 0.152	Consequence component 1: Physical	Depression	8.50 (6.54) (n = 6)	15.33 (12.60) (n = 18)	20.36 (15.42) (n =- 11)	$F_{(2, 32)} = 1.671$, p = 0.204
	State anxiety	26.67 (5.96)	33.89 (11.16)	35.45 (12.23)	$F_{(2, 32)} = 1.353$, p = 0.273		State anxiety	36.67 (14.14)	42.22 (18.33)	48.18 (11.87)	$F_{(2, 32)} = 1.076$, p = 0.353
	Positive affect	26.17 (5.12)	30.17 (8.92)	32.27 (7.30)	$F_{(2, 32)} = 1.149$, p = 0.330		Positive affect	31.83 (6.40)	31.06 (10.57)	32.09 (9.57)	$F_{(2, 32)} = 0.043$, p = 0.958
	Negative affect	10.67 (1.03)	15.89 (6.00)	17.82 (8.12)	$F_{(2, 32)} = 2.527$, p = 0.096		Negative affect	13.00 (4.38)	18.39 (10.40)	22.00 (10.04)	$F_{(2, 32)} = 1.719$, p = 0.195
Consequence component 2: Emotional	Depression	6.42 (3.87) (n = 12)	12.18 (7.00) (n = 11)	14.58 (9.53) (n = 12)	$F_{(2, 32)} = 4.079$, p = 0.026	Consequence component 2: Emotional	Depression	7.67 (6.76) (n = 12)	17.82 (14.87) (n = 11)	21.92 (12.94) (n = 12)	$F_{(2, 32)} = 4.522$, p = 0.019
	State anxiety	28.33 (7.18)	34.24 (11.26)	36.94 (12.83)	$F_{(2, 32)} = 2.036$, p = 0.147		State anxiety	32.78 (11.71)	44.55 (15.08)	52.22 (15.33)	**$F_{(2, 32)} = 5.782$, p = 0.007 G2 – G0 = 19.44 (1.24 – 37.65), p = 0.006**
	Positive affect	31.42 (7.96)	28.55 (8.38)	30.33 (8.05)	$F_{(2, 32)} = 0.363$, p = 0.698		Positive affect	33.42 (9.70)	31.45 (9.56)	29.67 (9.50)	$F_{(2, 32)} = 0.459$, p = 0.636
	Negative affect	12.33 (4.42)	15.55 (6.17)	18.92 (7.52)	$F_{(2, 32)} = 3.416$, p = 0.045		Negative affect	12.00 (3.30)	20.73 (11.25)	23.25 (9.73)	**$F_{(2, 32)} = 5.486$, p = 0.009 G2 – G0 = 11.25 (0.92 – 21.58), p = 0.006**

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

(continued)

Couples' illness perception similarity in -	State mood Mean (SD)	Patients' mood: Both disagree	Dissimilar	Both agree	F/ Post hoc results	Couples' illness perception similarity in -		Spouses' mood: Both disagree	Dis-similar	Both agree	F/ Post hoc results (99% CI; p value)
Timeline	Depression	9.00 (4.06) (n = 5)	9.11 (7.54) (n = 18)	14.75 (8.48) (n = 12)	$F_{(2, 32)} = 2.221$, p = 0.125	Timeline	depression	22.00 (13.57) (n = 5)	13.67 (12.40) (n = 18)	16.25 (14.19) (n = 12)	$F_{(2, 32)} = 0.795$, p = 0.460
	State anxiety	30.00 (12.47)	30.74 (11.00)	38.06 (9.48)	$F_{(2, 32)} = 1.932$, p = 0.161		State anxiety	50.00 (9.13)	42.22 (17.75)	41.67 (15.67)	$F_{(2, 32)} = 0.527$, p = 0.595
	Positive affect	22.40 (1.95)	32.06 (8.75)	30.50 (6.59)	$F_{(2, 32)} = 3.276$, p = 0.051		Positive affect	25.40 (7.93)	32.44 (10.51)	32.67 (7.87)	$F_{(2, 32)} = 1.244$, p = 0.302
	Negative affect	11.60 (2.61)	16.67 (7.65)	15.67 (5.69)	$F_{(2, 32)} = 1.167$, p = 0.324		Negative affect	22.20 (13.18)	19.22 (9.72)	16.17 (8.60)	$F_{(2, 32)} = 0.733$, p = 0.488
Control component 1: Active control	Depression	15.13 (10.47) (n = 8)	6.33 (3.97) (n = 9)	11.56 (7.05) (n = 18)	$F_{(2, 32)} = 3.110$, p = 0.058	Control component 1: Active control	depression	19.00 (15.01) (n = 8)	16.89 (13.12) (n = 9)	13.72 (12.65) (n = 18)	$F_{(2, 32)} = 0.480$, p = 0.623
	State anxiety	35.00 (7.13)	27.41 (7.60)	35.19 (13.05)	$F_{(2, 32)} = 1.719$, p = 0.195		State anxiety	45.00 (17.09)	41.48 (13.65)	43.15 (17.28)	$F_{(2, 32)} = 0.097$, p = 0.907
	Positive affect	29.25 (7.25)	29.33 (7.31)	30.94 (8.88)	$F_{(2, 32)} = 0.179$, p = 0.837		Positive affect	32.00 (9.12)	31.22 (3.77)	31.44 (11.70)	$F_{(2, 32)} = 0.015$, p = 0.986
	Negative affect	16.13 (7.16)	13.00 (5.17)	16.67 (6.95)	$F_{(2, 32)} = 0.958$, p = 0.394		Negative affect	19.13 (10.58)	17.78 (11.07)	18.78 (9.35)	$F_{(2, 32)} = 0.044$, p = 0.957
Control component 2: Passive control	Depression	9.55 (4.44) (n = 11)	13.73 (10.64) (n = 11)	10.00 (7.23) (n = 13)	$F_{(2, 32)} = 0.965$, p = 0.392	Control component 2: Passive control	Depression	12.45 (11.62) (n = 11)	11.73 (12.96) (n = 11)	21.92 (12.97) (n = 13)	$F_{(2, 32)} = 2.512$, p = 0.097
	State anxiety	33.64 (11.30)	36.06 (12.28)	30.26 (9.67)	$F_{(2, 32)} = 0.838$, p = 0.442		State anxiety	37.27 (16.52)	41.21 (14.93)	49.74 (15.06)	$F_{(2, 32)} = 2.055$, p = 0.145
	Positive affect	31.09 (6.85)	32.00 (7.46)	27.77 (9.19)	$F_{(2, 32)} = 0.950$, p = 0.397		Positive affect	32.82 (8.05)	37.00 (6.08)	25.77 (10.13)	**$F_{(2, 32)} = 5.643$, p = 0.009 G1 – G2 = 11.23 (0.23 – 22.23), p = 0.009**
	Negative affect	14.27 (4.94)	16.64 (7.16)	15.85 (7.58)	$F_{(2, 32)} = 0.354$, p = 0.705		Negative affect	16.45 (10.17)	16.27 (10.12)	22.38 (8.68)	$F_{(2, 32)} = 1.601$, p = 0.217
Symptom perception	Depression	10.00 (7.71) (n = 9)	10.38 (7.32) (n = 16)	13.00 (9.07) (n = 10)	$F_{(2, 32)} = 0.437$, p = 0.649	Symptom perception	Depression	16.78 (14.47) (n = 9)	16.63 (11.97) (n = 16)	13.40 (14.69) (n = 10)	$F_{(2, 32)} = 0.214$, p = 0.809
	State anxiety	31.48 (13.03)	32.92 (11.79)	35.00 (8.20)	$F_{(2, 32)} = 0.238$, p = 0.790		State anxiety	40.74 (14.89)	46..25 (17.25)	40.33 (15.43)	$F_{(2, 32)} = 0.545$, p = 0.585
	Positive affect	32.11 (8.75)	29.31 (8.86)	29.70 (5.98)	$F_{(2, 32)} = 0.362$, p = 0.699		Positive affect	29.22 (13.34)	31.06 (8.63)	34.30 (6.31)	$F_{(2, 32)} = 0.707$, p = 0.500
	Negative affect	14.67 (6.89)	15.63 (6.52)	16.40 (7.21)	$F_{(2, 32)} = 0.156$, p = 0.856		Negative affect	19.67 (11.05)	19.31 (10.52)	16.50 (7.89)	$F_{(2, 32)} = 0.313$, p = 0.734
Future MI threat	Depression	7.83 (6.24) (n = 6)	11.08 (7.37) (n = 12)	12.12 (8.67) (n = 17)	$F_{(2, 32)} = 0.654$, p = 0.527	Future MI threat	Depression	11.67 (16.83) (n = 6)	18.08 (12.31) (n = 12)	15.53 (12.73) (n = 17)	$F_{(2, 32)} = 0.468$, p = 0.630
	State anxiety	31.11 (12.94)	33.06 (10.96)	33.92 (10.94)	$F_{(2, 32)} = 0.138$, p = 0.872		State anxiety	39.44 (17.05)	45.00 (16.17)	43.14 (16.22)	$F_{(2, 32)} = 0.231$, p = 0.795
	Positive affect	32.67 (7.99)	29.75 (9.07)	29531 (7.46)	$F_{(2, 32)} = 0.352$, p = 0.706		Positive affect	37.17 (6.40)	30.67 (9.95)	30.12 (9.68)	$F_{(2, 32)} = 1.337$, p = 0.277
	Negative affect	15.83 (6.37)	14.17 (5.91)	16.53 (7.30)	$F_{(2, 32)} = 0.441$, p = 0.647		Negative affect	18.5 (13.31)	20.58 (10.10)	17.24 (8.56)	$F_{(2, 32)} = 0.397$, p = 0.675

G 2 = patient's score ≥ median & spouse's score ≥ median; both couples had negative illness perceptions (except for active control)
G 1 = either (patient's score ≥ median, spouse's score < median) or (patient's score < median, spouse's score ≥ median)
G 0 = patient's score < median, spouse's score < median; both couples had positive illness perceptions (except for active control)

Appendix E- 26. Comparisons of time-1 moods between 3 couple groups (based on time-1 patients' minus spouses' illness perceptions)

Time 1 moods	(Dis) similarity of couples' illness perceptions in -	F (p)	Post hoc (mean difference, 99% CI, p)	Mean (± SD)
Patient's moods				
Depression	Control component 2: Passive control	$F_{(2, 32)} = 7.230$, $p = 0.003$	No significant post hoc test results	G1 = 23.78 ± 12.23 (N = 9) G2 = 14.51 ± 7.39 (N = 8) G3 = 11.17 ± 5.66 (N = 18)
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	Control component 2: Passive control	$F_{(2, 32)} = 5.677$, $p = 0.008$	No significant post hoc test results	G1 = 28.22 ± 11.75 (N = 9) G2 = 18.75 ± 9.27 (N = 8) G3 = 16.56 ± 6.17 (N = 18)
Spouse's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X

G1 = patient > spouse; G2 = patient = spouse; G3 = patient < spouse

Appendix E- 27. Comparisons of time-2 moods between 3 couple groups (basing on time-2 patients' minus spouses' illness perceptions)

Time 2 moods	(Dis) similarity of couples' illness perceptions in -	F (p)	Post hoc (mean difference, 99% CI, p)	Mean (± SD)
Patient's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	Control component 1: Active control	$F_{(2, 32)} = 6.749$, $p = 0.004$	No significant post hoc test results	G1 = 10.95 ± 7.60 (N = 19) G2 = 19.71 ± 11.10 (N = 7) G3 = 10.11 ± 5.06 (N = 9)
Spouse's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X

G1 = patient > spouse; G2 = patient = spouse; G3 = patient < spouse

Appendix E- 28. Comparisons of time-3 moods between 3 couple groups (basing on time-3 patients' minus spouses' illness perceptions)

Time 3 moods	(Dis) similarity of couples' illness perceptions in -	F (p)	Post hoc (mean difference, 99% CI, p)	Mean (± SD)
Patient's moods				
Depression	Consequence component 2: Emotional consequences	$F_{(2, 32)} = 6.135$, p = 0.006	No significant post hoc test results	G1 = 16.08 ± 8.50 (N = 12) G2 = 14.00 ± 6.00 (N = 3) G3 = 7.55 ± 5.77 (N = 20)
State anxiety	Future MI threat	$F_{(2, 32)} = 5.355$, p = 0.010	G2 – G3 = 12.92 (2.03 – 2.38, p = 0.002,)	G1 = 13.78 ± 10.31 (N = 9) G2 = 13.19 ± 6.42 (N = 16) G3 = 5.10 ± 3.54 (N = 10)
Positive affect	X	X	X	X
Negative affect	X	X	X	X
Spouse's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X

G1 = patient > spouse; G2 = patient = spouse; G3 = patient < spouse

Appendix E- 29. Comparisons of 35 couples' time 2 mood between three cognitive groups at time 1 by using 'patients minus spouses'

Time 2 moods	(Dis) similarity of couples' illness perceptions in -	F (p)	Post hoc (mean difference, 99% CI, p)	Mean (± SD)
Patient's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X
Spouse's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X

G1 = patient > spouse; G2 = patient = spouse; G3 = patient < spouse

Appendix E- 30. Comparisons of 35 couples' time 3 mood between three cognitive groups at time 1 by using 'patients minus spouses'

Time 3 moods	(Dis) similarity of couples' illness perceptions in -	F (p)	Post hoc (mean difference, 99% CI, p)	Mean (± SD)
Patient's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X
Spouse's moods				
Depression	X	X	X	X
State anxiety	X	X	X	X
Positive affect	X	X	X	X
Negative affect	X	X	X	X

G1 = patient > spouse; G2 = patient = spouse; G3 = patient < spouse